

DOCUMENT RESUME

ED 117 549

CE 006 256

TITLE Careers in Construction, Building Maintenance and Allied Occupations. Junior High School. Course Outline.

INSTITUTION Dade County Public Schools, Miami, Fla. Office of Vocational and Adult Education.

REPORT NO VT-102-428

NOTE 210p.; An authorized course of instruction for the Quinmester Program; Several pages may reproduce poorly

EDRS PRICE MF-\$0.83 HC-\$11.37 Plus Postage

DESCRIPTORS *Building Trades; *Career Exploration; Course Content; *Curriculum Guides; Developmental Programs; Electrical Occupations; Equipment Maintenance; *Hand Tools; *Junior High Schools; *Maintenance; Masonry; Painting; Plumbing; Post Testing; Pretests; Safety Education; Simulated Environment; Trade and Industrial Education

IDENTIFIERS Florida; Quinmester Program

ABSTRACT

The guide was prepared to assist student exploration in the fields of construction and building maintenance and as preparation for further specialized training. The course was prepared for quinmester use and includes a series of manipulative job assignments within a laboratory equipped to simulate the actual job atmosphere found in the construction and building maintenance industries. The table of contents provides a suggested hourly breakdown for the orientation unit and the introductory units for carpentry, plumbing maintenance, electrical maintenance, the trowel trades, painting and decorating, and occupational safety. Instructional materials such as handouts, building plans and diagrams, pre- and post-testing materials, resource lists, and bibliographies are provided for some of the units. (LJ)

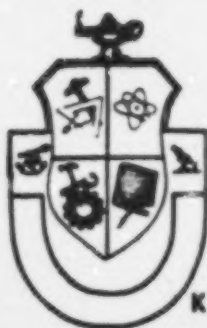
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COURSE OUTLINE

Careers in Construction, Building Maintenance and Allied Occupations

JUNIOR HIGH SCHOOL



**EXEMPLARY
PROGRAM**

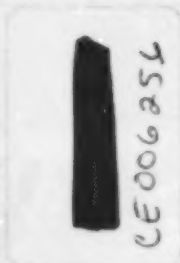
CAREER EDUCATION MODEL
K through POST-SECONDARY & ADULT

Submitted by the County Office of Vocational & Adult Education

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VT 102428

DADE COUNTY PUBLIC SCHOOLS
1410 NORTHEAST SECOND AVENUE
MIAMI, FLORIDA 33132

Course Outline

CAREERS IN CONSTRUCTION, BUILDING MAINTENANCE

and

ALLIED OCCUPATIONS

Department _____ Course _____

Junior High School

(Quin-1)

The County Office of
VOCATIONAL AND ADULT EDUCATION

Course Description

Careers in Construction, Building
Maintenance and Allied Occupations-Qu

<u>State Category</u> Number	<u>County Dept.</u> Number	<u>County Course</u> Number
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This course is designed for quinmester use. It is exploratory in nature and is designed to present students with an overview of the various careers and opportunities within this broad occupational spectrum. Upon completion of this quin the student will advance to the second quin. Previous experience in construction and building maintenance is not required.

Submitted by:

Prepared by:

Approved date: _____

PREFACE

The following course outline entitled "Careers in Construction, Building Maintenance and Allied Occupations" has been prepared as a guide to assist the student in the exploration of the field of construction and building maintenance and to prepare him with a foundation for further specialized training.

It is one of a cluster of vocational courses being offered to middle and/or junior high school students and is 180 hours in length. Previous experiences in construction and/or building maintenance are not required.

This course has been prepared for quinmester use and successful completion of quin one is a prerequisite for quin two. Each quin is presented in 90 hours and includes a series of manipulative job assignments within a laboratory equipped to simulate the real job atmosphere found in the construction and building maintenance industries. Parallel courses in related mathematics, science and communications skills may be offered to help the student overcome any difficulty in these subjects areas specifically related to this course.

Three major values can be obtained by students who complete this course. First, it provides all students with an awareness of the nature and values of a work oriented society. Second, it provides students headed towards high school, skills and knowledge which will be useful in making future educational decisions and serve as a solid foundation for career specialization. Finally, it provides a set of marketable entry level job skills for those who will enter the labor market before completing high school.

This course outline was developed through the cooperative efforts of construction and building maintenance instructors and supervisory personnel of the Vocational Exemplary Program, School Board of Dade County, the County Office of Vocational and Adult Education.

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GOALS

1. To present to the student information of the educational and job opportunities in the construction and building maintenance industry.
2. To present to the student the varied career opportunities related to the construction and building maintenance industry.
3. To develop in the student pride in workmanship and make him aware of his responsibilities to his employer and his customers.
4. To develop in the student sound safety habits applicable to the broad occupational careers in construction and building maintenance industries.
5. To develop in the student a positive attitude of employee to employee relationship.
6. To introduce and develop in the student the basic skills required to become employed in the construction and building maintenance industry.
7. To present to the student a variety of manipulative experiences in the construction trades so he can better select his occupational area.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - ORIENTATION

The student will be able to:

1. Answer 70% of test items given on school regulations, fire drills, shop regulations and shop safety.
2. List two methods that will be used to measure his progress.

BLOCK II - INTRODUCTION TO CARPENTRY

The student will be able to:

1. Identify four hand tools used in the carpentry trade.
2. Identify three tools used for layout work.
3. Identify two power tools used in the carpentry trade.
4. Identify three house plans when shown to him by the instructor.
5. Identify three types of fasteners used in the carpentry trade.
6. Identify three structural members of a floor frame.

BLOCK III - INTRODUCTION TO PLUMBING MAINTENANCE

The student will be able to:

1. Identify eight hand tools used in the plumbing trade when shown to him by the instructor.
2. List two methods of joining copper tubing when asked to do so by the instructor.
3. List two tools that are used to replace a washer on a compression faucet when asked to do so by the instructor.

BLOCK IV - INTRODUCTION TO ELECTRICAL MAINTENANCE

The student will be able to:

1. List the color of wire used in house wiring when asked by the instructor.
2. Identify four hand tools used in electrical maintenance work when shown to him.
3. Add a wire to an existing two wire circuit in the time specified by the instructor.

BLOCK V - INTRODUCTION TO THE TROWEL TRADES

The student will be able to:

1. Identify four tools used in concrete work when shown to him by the instructor.
2. List two types of mortar mix when asked to do so by the instructor.

BLOCK VI - INTRODUCTION TO PAINTING AND DECORATING

The student will be able to:

1. Identify two flammable materials used in the painting and decorating trade.
2. Identify three pieces of equipment used in the painting and decorating trade.
3. Identify two types of paint applicators when shown to him by the instructor.
4. Select the correct thinner to be used with the specific coating presented to him by the instructor.

COURSE OUTLINE

Careers in Construction, Building Maintenance and Allied Occupations (Junior High School)

BLOCK

I. ORIENTATION

A. Objectives

1. Purpose and scope of course
2. Introduction to construction and building trades
3. Development of manipulative skills

B. School and Shop Regulations

1. Appropriate dress
2. Safety regulations
 - a. Fire drill procedures
 - b. Fire fighting equipment
 - c. Electrical equipment and precautions
 - d. Use of safety equipment

C. Familiarization of Shop Equipment, Tools and Materials

1. Hand tools
2. Machines
3. Layout and measuring tools
4. Types of material used in the construction and building maintenance trades.

D. Methods of Evaluation

1. Written
2. Oral
3. Manipulative
4. Diagnostic

E. Student's Benefits

1. Career awareness
2. Basic skills
3. Educational opportunities
4. Employment opportunities
 - a. Scope of the trade
 - b. Job opportunities

II. INTRODUCTION TO CARPENTRY

A. Hand Tools

1. Nomenclature
 - a. Hammers
 - b. Saws
 - c. Brace and bits
 - d. Screwdrivers
 - e. Chisels
 - f. Planes
 - g. Hand drill
 - h. Ripping bar
 - i. Hatchet

- j. Adjustable wrench
- k. Side cutting pliers
- 2. Use, care, and storage of tools
- 3. Work precautions and safety practices

B. Measuring and Layout Tools

- 1. Nomenclature
 - a. Folding rule
 - b. Steel tapes
 - c. Framing squares
 - d. Levels
 - e. Plumb bob
 - f. Chalk line
 - g. Combination square
 - h. "T" level
 - i. Wing dividers
 - j. Marking gauge
 - k. Scratch awl
- 2. Use, care, and storage of tools
- 3. Work precautions and safety practices

C. Power Tools

- 1. Circular saw
 - a. Types and use
 - b. Blade types and use
 - c. Maintenance of circular saws and blades
 - d. Using circular saw
 - e. Work precautions and safety practices
- 2. Saber saw
 - a. Types and use
 - b. Blade types and use
 - c. Maintenance of saber saw
 - d. Using saber saw
 - e. Work precautions and safety practices

D. Fasteners

- 1. Nails
 - a. Types and use
 - b. Sizes
- 2. Screws
 - a. Types and use
 - b. Sizes
- 3. Adhesives
 - a. Types
 - b. Use of each type
- 4. Framing anchors
 - a. Types
 - b. Purpose and use
- 5. Truss plates
 - a. Types
 - b. Purpose and use

E. House Plans, Specifications, and Building Codes

1. Plot plans
 - a. content
 - (1) Lot lines
 - (2) Outside lines of building
 - (3) Location of building on lot
 - b. Reading plot plans
2. Foundation plans
 - a. Content
 - (1) Footings
 - (2) Foundations
 - b. Reading foundation plans
3. Floor plans
 - a. Content
 - (1) Room identification and size
 - (2) Location and size of windows and doors
 - (3) Location of appliances, plumbing fixtures, and utility installations
 - b. Reading floor plans
4. Elevation plans
 - a. Content
 - (1) Building shown in true relationship
 - (2) Floor levels
 - (3) Window and door heights
 - (4) Roof slopes
 - (5) Kind of material used on surface of walls and roof
 - b. Reading elevation plans
5. Framing plans
 - a. Floor and ceiling plans
 - (1) Joist arrangement and spacing
 - (2) Partitions
 - (3) Openings
 - (4) Reading floor and ceiling plans
 - b. Roof plans
 - (1) Rafter arrangement and spacing
 - (2) Openings
 - (3) Reading roof plans
6. Specifications
 - a. Purpose
 - b. Use
 - c. Content
 - (1) Specification of material to be used
 - (2) Application methods and procedures
 - (3) Guarantee of quality and performance
7. Building codes
 - a. Purpose
 - b. Use
 - c. Content
 - (1) Material specification
 - (2) Minimum requirements for room sizes, ceiling heights, lighting, and ventilation
 - (3) Installation methods

F. Footing and Foundation Forms

1. Laying out building lines
 - a. 6, 8, 10 method
 - b. Practical application
2. Batters boards
 - a. Purpose
 - b. Construction of batter boards

3. Footing forms
 - a. Width
 - b. Thickness
 - c. Location of footing forms in relation to the building lines
 - d. Construction of footing frames

G. Framing

1. Floor and ceiling framing
 - a. Basic structural members of floor frame
 - (1) Joist
 - (2) Joist headers
 - (3) Sill
 - (4) Sub floor
 - b. Size of lumber
 - c. Nailing of joist and joist headers
 - d. Bridging
 - (1) Solid bridging
 - (2) Prefabricated steel bridging
 - e. Construction of floor frame
 - f. Installation of sub floor
 - g. Difference between floor frame and ceiling frame
2. Wall Framing
 - a. Basic structural members of wall frame
 - (1) Sole plates
 - (2) Top plates
 - (3) Studs
 - d. Size of lumber
 - c. Spacing of studs
 - d. Nailing of studs and plates
 - e. Construction of wall frame
3. Roof framing
 - a. Basic structural members of roof frame
 - (1) Rafters
 - (2) Ridge
 - b. Size of lumber
 - c. Nailing of rafters
 - d. Construction of gable roof

BLOCK III INTRODUCTION TO PLUMBING

A. Plumbing and Pipe Fitting Tools

1. Hand tools
 - a. Nomenclature
 - (1) Pipe wrenches
 - (2) Pipe cutters
 - (3) Reamers
 - (4) Stocks and dies
 - (5) Vices
 - (6) Augers
 - (7) Force cup (plumber's friend)
 - (8) Sewer snake
 - (9) Calking tools
 - (10) Tube cutter
 - (11) Flaring tools
 - (12) Miscellaneous tools
 - (a) Measuring tapes and folding rules
 - (b) Chisels
 - (c) Levels and plumbs

- (d) Hammers
- (e) Brace and bits
- (f) Saws
- (g) Wrenches
 - 1) Combination
 - 2) Adjustable
 - 3) Monkey

- b. Care and use of tools
- c. Cleaning and storage of tools

B. Plumbing Systems

1. Water supply systems

- a. Components
 - (1) Water lines
 - (a) Galvanized iron
 - (b) Copper tubing
 - (2) Valves
 - (a) Main shut off
 - (b) Individual shut off
- b. Use of components
- c. Threading galvanized pipe
- d. Joining threaded pipe
 - (1) Couplings
 - (2) Nipples
 - (3) Tees
- e. Joining copper tubing
 - (1) Solder
 - (2) Compression
 - (3) Flared

2. Sewage Systems

- a. Components
 - (1) Sewer lines
 - (2) Vents
 - (3) Traps
- b. Use of components

3. Gas piping system

- a. Components
 - (1) Black iron pipe
 - (2) ~~Sumps~~
 - (3) Shut off valve
- b. Use of components
- c. Joining gas pipe
- d. Soap and water leak test

C. Care and Upkeep of Plumbing

1. Repairing compression faucets

- a. Tools required
- b. Parts required
- c. Technique of replacing packing and washers

2. Adjusting valve handles

- a. Tools required
- b. Techniques of removing handles
- c. Techniques of replacing handles

3. Repairing water leaks
 - a. Tools required
 - b. Water pressure
 - c. Replacing joined pipe
 - d. Replacing valves
4. Draining pipes
 - a. Purpose
 - b. Tools required
 - c. Relieving pressures
 - d. Adding anti-freeze

BLOCK IV INTRODUCTION TO ELECTRICAL MAINTENANCE

- A. Safety Precautions
 1. Dangers of electricity
 2. Color code of wire
 3. Proper insulation of tools
 4. Proper care of electrical systems
 5. Removal of rings, wrist watches, and metal objects
- B. Hand Tools
 1. Nomenclature
 - a. Hammer
 - b. Brace and long shank bit
 - c. Keyhole saw
 - d. Hack saw
 - e. Test light
 - f. Soldering iron
 - g. Folding rule
 - h. Chisels
 - i. Lineman's pliers
 - j. Long nose pliers
 - k. Fish wire
 - l. Conduit bender
 - m. Screwdrivers
 - n. Round file
 - o. Pipe wrench
 - p. Wire strippers
 2. Care and use of hand tools
 3. Proper storage of hand tools
- C. Materials Used in Electrical Wiring
 1. Conduit
 - a. Purpose
 - b. Use
 - c. Sizes
 - d. Cutting
 - e. Bending
 - f. Joining
 - g. Installation

2. Romex
 - a. Uses
 - b. Sizes
 - c. Cutting and splicing
 - d. Installation
3. Wire
 - a. Sizes
 - b. Colors
 - c. Pulling
 - (1) Two wire
 - (2) Three wire
 - (3) Adding a wire
 - (4) Repulling
4. Switches
 - a. Purpose
 - b. Types
 - (1) Double pole switch
 - (2) Three way switch
 - c. Installation
5. Outlets
 - a. Purpose
 - b. Types
 - (1) Single
 - (2) Duplex
 - c. Installation
6. Plugs
 - a. Purpose
 - b. Types
 - (1) Two wire
 - (2) Three wire
 - c. Repairing plugs
7. Cords
 - a. Types
 - (1) Lamp
 - (2) Appliance
 - (3) Extension
 - b. Repairing techniques

BLOCK V INTRODUCTION TO TROWEL TRADES

- A. Concrete Work
 1. Hand tools
 - a. Trowels
 - b. Hawks
 - c. Jukes
 - d. Hoes
 - e. Shovels
 - f. Floats
 - g. Darbys
 2. Use of hand tools
 3. Cleaning and care of hand tools

4. Forms
 - a. Wooden
 - b. Steel
5. Concrete mixes
 - a. Ready mix (transport mix)
 - b. Hand mix
 - c. Bag mix
6. Pouring
7. Finishing

B. Masonry Work

1. Hand tools
 - a. Masonry hammer
 - b. Masonry chisel
 - c. Trowels
 - d. Jointers
 - e. Mortar boards
 - f. Wheelbarrow
 - g. Shovel
2. Use of hand tools
3. Cleaning and care of hand tools
4. Mortar mixes
 - a. Lime
 - b. Cement
 - c. Lime-cement
5. Bricks and blocks
 - a. Types
 - b. Sizes
6. Mortar joints
 - a. Struck
 - b. Weather
 - c. "V"
 - d. Flush or plain cut
7. Techniques of repairing and replacing
 - a. Stone work
 - b. Brick work
 - c. Block work

BLOCK VI INTRODUCTION TO PAINTING AND DECORATING

A. Health and Safety Rules

1. Fumes
 - a. Types
 - (1) Paint
 - (2) Thinners
 - (3) Paint containing lead
 - b. Prevention
 - (1) Ventilation
 - (2) Respirators
2. Skin Irritants
 - a. Types
 - (1) Acids
 - (2) Alkali

- b. Precautions
- c. First aid
- 3. Fire Hazards
 - a. Inflammables
 - (1) Paints
 - (2) Paint thinners
 - b. Equipment
 - (1) Blow torches
 - (2) Acetylene torches

B. Tools and Equipment

- 1. Nomenclature
 - a. Brushes
 - (1) Animal hair
 - (2) Synthetic
 - b. Paint rollers
 - c. Spray guns
 - d. Ladders
 - (1) Types
 - (a) Straight
 - (b) Extension
 - (c) Trestle
 - (d) Extension-trestle
 - (2) Use of each type
 - (3) Safety precautions when using ladders
 - e. Scaffolds
 - (1) Types
 - (a) Outrigger
 - (b) Suspended
 - (c) Ladder jack
 - (d) Steel scaffolding
 - (2) Use of each type
 - (3) Safety precaution when using scaffolds
 - f. Drop cloths
 - g. Blow torches
 - h. Miscellaneous tools and equipment
 - (1) Putty knives
 - (2) Screwdrivers
 - (3) Caulking guns
 - (4) Brush holders
 - (5) Wiping rags
 - (6) Paint scrapers
 - (7) Paint strainers
 - (8) Hammers
 - (9) Pliers
- 2. Use of tools and equipment
- 3. Cleaning and storage
- 4. Work precautions and safety practices

C. Paint Applicators

- 1. Brushes
 - a. Types
 - (1) Wall
 - (2) Sash

- (3) Enamel and varnish
 - (4) Stucco and masonry
 - (5) Wire
 - b. Cleaning and care
 - c. Renovating hard brushes
 - d. Use of each type
 - 2. Rollers
 - a. Types
 - (1) Dip
 - (2) Fountain
 - (3) Pressure
 - b. Cleaning and care
 - c. Use of each type
 - 3. Spray Guns
 - a. Types
 - (1) Pressure
 - (2) Suction
 - b. Adjusting nozzle
 - c. Cleaning and care
 - d. Use of spray gun
- D. Application of Paint
- 1. Materials used for interior and exterior finishing
 - a. Undercoats
 - b. Paint
 - (1) Gloss
 - (2) Semi-gloss
 - (3) Flat
 - (4) Oil base
 - (5) Water base
 - c. Enamels
 - d. Varnishes
 - e. Shellac
 - f. Stains
 - g. Thinners
 - (1) Lacquer
 - (2) Turpentine
 - (3) Alcohol
 - h. Masking tape
 - 2. Use of materials
 - 3. Selection of materials
 - 4. Using each type

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Bathroom and Passage. (REW-3)

Hall and Front Entrance. (REW-4)

Kitchen, Rear Entry. (REW-5)

Living Room. (REW-7)

Utility Room Receptacles. (REW-12)

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Wood Properties. DCA. (WT-6)

APPENDIX
QUINMESTER POST TEST SAMPLE

Careers in Construction, Building Maintenance and Allied Occupations

QUINMESTER POST TEST - QUIN 1

BLOCK I ORIENTATION

1. Goggles must be worn in the shop when using machines because
 - a. they protect your eyes
 - b. Florida state law demands it
 - c. it is a good safety practice
 - d. it is good work precautions
 - e. all of the above are correct
2. What type of examinations will be given to you during this course to check your progress?
 - a. written and oral
 - b. diagnostic and written
 - c. manipulative and oral
 - d. oral and diagnostic
 - e. all of the above
3. What trades are associated with the construction and building maintenance industry?
 - a. plumber, welder and mechanic
 - b. electrician, carpenter, and painter
 - c. artist, brickmaker, and plumber
 - d. masonry, roof, and concrete
 - e. machine operator, blueprint maker, and roofer

BLOCK II CARPENTRY

1. The saw used to cut a board lengthwise is a
 - a. cross cut saw
 - b. planning saw
 - c. rip saw
 - d. keyhole saw
 - e. coping saw
2. Which of the following tools are used for lay-out work in the carpentry trade?
 - a. planes, hammers, and saws
 - b. try square, brace, and bit
 - c. levels, framing squares, and drills
 - d. chalk line, levels, and steel tapes
 - e. all of the above are correct
3. Two power tools used by the carpenter are
 - a. brace and bit and chisel
 - b. saber saw and circular saw
 - c. hatchet and hammer
 - d. saber saw and mixing machine
 - e. electric drill and hand drill

4. Common fasteners used in the carpentry trade are
 - a. nails and glue
 - b. screws and framing anchors
 - c. truss plates and nails
 - d. screws and glue
 - e. all of the above are correct
5. Which plans listed below are considered house plans?
 - a. roof and cellar
 - b. floor and blueprint
 - c. elevation and framing
 - d. framing and chimney
 - e. cellar and floor
6. A joist is a structural member of a
 - a. floor
 - b. roof
 - c. wall
 - d. gable
 - e. foundation

BLOCK III PLUMBING

1. Which of the following are plumber's hand tools?
 - a. augers and tube bender
 - b. tube cutter and reamer
 - c. stocks and dies and pipe wrenches
 - d. flaring tool and pipe cutter
 - e. all of the above are correct
2. Which method can be used when joining copper tubing?
 - a. soldering or flared
 - b. threading or gasket
 - c. PCV gluing or acetate
 - d. flaring or wedging
 - e. none of the above can be used
3. Which of the tools listed below are needed to replace a gasket on a? compression type faucet
 - a. hammer and scissors
 - b. screwdriver and adjustable wrench
 - c. pipe wrench and handle remover
 - d. auger and calking tool
 - e. monkey wrench and chisel

BLOCK IV ELECTRICAL

1. A two wire circuit contains what colored wires
 - a. one green, and one white
 - b. one black, and one white
 - c. one red, and one white
 - d. one red, and one green
 - e. one black, and one red

2. To remove wire insulation from a wire you use
 - a. side cutters
 - b. acids
 - c. diagonal pliers
 - d. wire stripping pliers
 - e. chisel
3. When adding a wire to an existing two wire circuit you should
 - a. use a fish tape to pull the new wire through the conduit
 - b. replace the two existing wires with three wires
 - c. make sure the new wire is blue so you can identify it later
 - d. use one of the existing wires to pull through two wires
 - e. I don't know the answer

BLOCK V TROWEL TRADES

1. Tools used in the masonry trades are
 - a. shovels, hoes and pans
 - b. jukes, darbys, and floats
 - c. hammers, trowels, and mortar boxes
 - d. hawks, hammers, and hoes
 - e. all of the above are correct
2. Two types of mortar mix are
 - a. portland and lime
 - b. lime and cement
 - c. concrete and sand
 - d. gravel and cement
 - e. lime-sand and cement

BLOCK VI PAINTING AND DECORATING

1. Precautions must be taken when working near an open fire of electrical systems with
 - a. paint
 - b. turpentine
 - c. alcohol
 - d. touline
 - e. all of the above
2. When painting the top of an exterior wall it is best to use a/an
 - a. straight ladder
 - b. extension ladder
 - c. trestle ladder
 - d. extension-trestle ladder
 - e. any type of ladder
3. The most common paint applicators used for interior wall painting are
 - a. spray gun and brush
 - b. brush and sponge
 - c. roller and wiping rag

- d. brush and roller
 - e. spray gun and roller
4. The thinner used to thin oil base paint is
- a. alcohol
 - b. water
 - c. turpentine
 - d. linseed oil
 - e. touline

Careers in Construction, Building Maintenance and Allied Occupations

KEY TO POST TEST - QUIN 1

BLOCK I

1. e
2. e
3. b

BLOCK II

1. c
2. d
3. b
4. e
5. c
6. a

BLOCK III

1. e
2. a
3. b

BLOCK IV

1. b
2. d
3. d

BLOCK V

1. e
2. b

BLOCK VI

1. e
2. b
3. d
4. c

DADE COUNTY PUBLIC SCHOOLS
1410 NORTHEAST SECOND AVENUE
MIAMI, FLORIDA 33132

Course Outline

CAREERS IN CONSTRUCTION, BUILDING MAINTENANCE

and

ALLIED OCCUPATIONS

Department _____ Course _____

Junior High School

(Quin-II)

The County Office of
VOCATIONAL AND ADULT EDUCATION

COURSE DESCRIPTION

Careers in Construction,
Building Maintenance and
Allied Occupations - QUIN II

State Category
Number

County Dept.
Number

County Course
Number

This course is designed for quinmester use. It is exploratory in nature and is designed to present students with an overview of the various careers and occupations within this broad occupational spectrum. Completion of Quin I is a prerequisite to this quin.

Submitted by:

Prepared by:

Approval date:

PREFACE

The following course outline entitled "Careers in Construction, Building Maintenance, and Allied Occupations" has been prepared as a guide to assist the student in the exploration of the field of construction and building maintenance and to prepare him with a foundation for further specialized training.

It is the second quin of one of the clusters of vocational courses being offered to middle and/or junior high school students and is 90 hours in length. Completion of quin 1 is a prerequisite to this quin. This quin is designed to present to the student, manipulative job assignments within a laboratory equipped to simulate the real job atmosphere found in the construction and building maintenance industry. Parallel courses in related mathematics, science, and communication skills may be offered to assist the student to overcome any difficulties in these subject areas related specifically to this quin.

Three major values can be obtained by students who complete this course. First, it provides all students with an awareness of the nature and values of a work oriented society. Second, it provides students headed toward high school, skills and knowledge which will be useful in making future educational decisions and serve as a solid foundation for career specialization. Finally, it provides a set of marketable entry level job skills for those who will enter the labor market before completing high school.

This course outline was developed through the cooperative efforts of construction and building maintenance instructors and supervisory personnel of the Vocational Exemplary Program, School Board of Dade County, The County Office of Vocational and Adult Education.

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GOALS

1. To present to the student information pertaining to the educational and job opportunities in the construction and building maintenance industry.
2. To present to the student the varied career opportunities related to the construction and building maintenance industry.
3. To develop in the student pride in workmanship and make him aware of his responsibilities to his employer and his customers.
4. To develop in the student sound safety habits applicable to the broad occupational careers in construction and building maintenance industry.
5. To develop in the student a positive attitude of employee to employee relationship.
6. To introduce and develop in the student the basic skills required to become employed in the construction and building maintenance industry.
7. To present to the student a variety of manipulative experiences in the construction trades so he can better select his occupational area.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - CARPENTRY

The student will be able to:

1. Explain the reason flashing is necessary on roofs.
2. Three types of exterior wall finishes.
3. List three methods of finishing interior walls.
4. Install a stripwood floor to a degree of proficiency specified by the instructor.
5. Install hinges on a door when told the swing of the door.
6. Identify three types of interior paneling.

BLOCK II - PLUMBING MAINTENANCE

The student will be able to:

1. Repair and perform minor maintenance on plumbing fixtures
2. List two methods of unclogging drains
3. Repair chipped enamel to a degree of proficiency specified by the instructor.

BLOCK III - ELECTRICAL MAINTENANCE

The student will be able to:

1. Check fuses and circuit breakers to determine the condition of each.
2. Select the proper size conduit for a circuit when told the number of wires and size of wire it will contain.
3. List four rooms that require lighting and convenience outlets.
4. Modify an existing circuit when told what modifications are required.

BLOCK IV - TROWEL TRADES

The student will be able to:

1. Mix concrete, using the proper amount of ingredient necessary.
2. Lay a course of bricks or concrete blocks to a degree of proficiency specified by the instructor.

BLOCK V - PAINTING, DECORATING AND INTERIOR MAINTENANCE

The student will be able to:

1. Paint a surface selected by the instructor to a degree of proficiency specified by the instructor.
2. Hang one length of wall paper to a degree of proficiency specified by the instructor.
3. Replace screen in an aluminum frame.

BLOCK VI - CAREER PLANNING

The student will be able to:

1. List 5 occupations that can be pursued in the construction trades.
2. List two means of finding employment in the construction and building maintenance trades.

COURSE OUTLINE

CAREERS IN CONSTRUCTION, BUILDING MAINTENANCE AND ALLIED OCCUPATIONS (QUIN II)

BLOCK I - CARPENTRY

A. Roofs

1. Roofing materials
 - a. Asphalt products
 - (1) Saturated felts
 - (2) Roll roofing
 - (3) Shingles
 - b. Wood
 - c. Gravel
 - d. Slate and tile
2. Application of roofing material
 - a. Underlaying
 - b. Drip edge
 - c. Flashing
 - (1) Valley
 - (2) Wall
 - (3) Vent stack
3. Nailing and fastening
4. Practical application

B. Exterior Wall Finish

1. Materials used
 - a. Aluminum
 - b. Hardboard
 - c. Plywood
 - d. Asphalt
 - e. Mineral fiber
 - f. Wood shingles
2. Application of exterior wall finishes
3. Installation procedures
4. Nailing and fastening
5. Practical application

C. Interior Walls and Ceilings

1. Materials used
 - a. Gypsum wallboard
 - b. Plywood
 - c. Solid wood
 - d. Plaster
2. Application of interior walls and ceilings
3. Measuring and Cutting
4. Fastening
 - a. Nails
 - b. Staples
 - c. Screws
 - d. Adhesive
5. Joint concealment
6. Practical application

D. Floor finishing

1. Material used

a. Wood

- (1) Types
 - (a) Strip
 - (b) Plank
 - (c) Block
- (2) Installation

b. Tile

- (1) Types
 - (a) Abestos
 - (b) Vinyl
 - (c) Vinyl - abestos
- (2) Installation
- (3) Cutting

E. Doors and Interior Trim

1. Exterior Doors

a. Types

- (1) Hollow Core
- (2) Solid Core
- (3) Metal
- (4) Fire

b. Frames

- (1) Components
 - (a) Heads
 - (b) Jambs
 - (c) Sills
- (2) Assembled (ready to install)
- (3) Disassembled (knocked down)
- (4) Installations of door frames
 - (a) Measuring
 - (b) Cutting
 - (c) Plumbing
 - (d) Shimming
 - (e) Nailing
 - (f) Mortising

2. Interior doors

a. Types

- (1) Hollow core
- (2) Solid core

b. Frames

- (1) Components
 - (a) Side jambs
 - (b) Head jambs
- (2) Installation
 - (a) Measuring
 - (b) Cutting
 - (c) Plumbing
 - (d) Nailing

3. Door Hanging

a. Door swing

b. Fitting door in frame

- (1) Planning
- (2) Sanding

- c. Hinging
 - (1) Types
 - (a) Butt
 - (b) Mortising
 - (c) Cabinet
 - (2) Layout
 - (3) Mortising
 - (4) Installation of hinges
 - d. Door locks
 - (1) Types
 - (a) Mortise lock set
 - (b) Cylindrical lock set
 - (c) Unit lock set
 - (2) Layout
 - (3) Drilling holes for locks
 - (4) Installation of locks
4. Interior Trim
- a. Molding
 - (1) Baseboard
 - (2) Base shoe
 - (3) Casing
 - (4) Window and door stops
 - (5) Quarter round
 - b. Cutting
 - (1) Mitering
 - (2) Coping
 - (3) Squaring
 - c. Installation
 - (1) Nailing
 - (2) Countersinking

V. Paneling

- 1. Types
 - a. Solid lumber
 - b. Plywood
 - c. Plastic laminates
 - d. Hardboards
- 2. Installation methods
 - a. Nailing
 - b. Adhesive
- c. Practical application

BLOCK II - PLUMBING MAINTENANCE

A. Fixtures

- 1. Flush tank
 - a. Components
 - (1) Inlet valve
 - (2) Discharge valve
 - (3) Float
 - (4) Tank ball
 - b. Replacing tank ball
 - c. Repairing supply valve
 - (1) Cleaning
 - (2) Replacing washers or diaphragms

- d. Practical Application
- 2. Hot water heater
 - a. Operating principle
 - b. Repairing water tank leaks
 - (1) Toggle bolt
 - (2) Tapered plug
 - c. Cleaning the tank
 - (1) Purpose
 - (2) Procedure
 - d. Practical application
- B. Drain Maintenance
 - 1. Cleaning methods
 - a. Tools
 - (1) Plumbers snake
 - (2) Plumbers friend
 - b. Forced water
 - c. Solvents
 - d. Practical applications
 - 2. Replacing drains
 - a. Tools required
 - b. Washers gaskets
 - c. Practical application
- C. Patching Chipped Enamel
 - 1. Remove rust
 - 2. Warm area
 - 3. Apply mending lacquer
 - 4. Allow drying time
 - 5. Practical application

BLOCK III - ELECTRICAL MAINTENANCE

- A. Fuses and Circuit Breakers
 - 1. Fuses
 - a. Types
 - (1) Switch
 - (2) Button
 - b. Purpose
 - c. Rating
 - d. Replacing circuit breakers
 - e. Checking circuit breakers
 - 3. Comparison of fuses to circuit breakers
- B. Service Requirements
 - 1. Amperage
 - a. Nominal rating
 - b. Maximum capacity
 - c. Size of wire
 - d. Size of conduit
 - 2. Voltage
 - a. 115 V circuit
 - b. 230 V circuit

3. Ground
 4. Conduit size
 - a. Size of wire
 - b. Number of wires
 5. Individual equipment circuits
 - a. Range
 - (1) 35-A - 3W - 115/230V (up to 12KW)
 - (2) 50-A - 3W - 115/230V (above 12 KW)
 - b. Clothes Dryer 25-A - 3W - 115/23-V
 - c. Air cooling unit 25-A - 2W - 230V
- C. Outlet Requirements
1. Recommended requirements
 - a. Lighting outlets and convenience outlet
 - (1) Living room
 - (2) Dining room
 - (3) Kitchen
 - (4) Laundry/utility
 - (5) Bathroom
 - (6) Recreation room
 - (7) Garage
 - b. Special wiring
 - (1) Living room
 - (a) Heating thermostat
 - (b) Door chimes
 - (2) Kitchen
 - (a) Range
 - (b) Ventilating fan
 - (c) Dishwasher
 - (d) Freezer
 - (e) Garbage disposer
 2. Electrical symbols on blueprints
 3. Spacing of convenience outlets
- D. Modifying Existing Circuits
1. Adding outlet and ceiling light beyond switch
 2. Controlling ceiling light beyond switches using two 3-way switches
 3. Adding outlet and switch beyond existing light
 4. Adding new convenience outlets beyond existing outlet
 5. Adding wall switch to control light at end of run

BLOCK IV - TROWEL TRADES

- A. Concrete
 1. Binders
 - a. Common cement
 - b. Hydraulic Cement
 - c. Non-hydraulic cement
 2. Aggregates
 - a. Fine
 - b. Coarse
 3. Proportioning the materials
 - a. One part cement
 - b. Two parts sand
 - c. Four parts stone

- 4. Mixing materials
 - a. Hand mixing
 - b. Machine mixing
 - 5. Concrete forms
 - a. Types
 - (1) Foundation
 - (2) Wall
 - (3) Patio
 - (4) Sidewalk
 - (5) Column
 - b. Material used
 - (1) Wood
 - (2) Metal
 - c. Construction of forms
 - 6. Reinforcements
 - a. Purpose
 - b. Types
 - (1) Rods
 - (2) Wire
 - (3) Expanded metal
 - 7. Pouring concrete
 - 8. Practical applications
- B. Masonry Work**
- 1. Tuck pointing
 - a. Cleaning old mortar from joint
 - b. Flushing old joint with water
 - c. Mixing mortar
 - (1) Mason's cement
 - (2) Block and brick sand
 - (3) Water
 - d. Forcing mortar into joints
 - e. Jointing
 - 2. Laying masonry units
 - a. Wetting units
 - b. Making beds
 - (1) Full-width bed for brick
 - (2) Side bed for concrete block
 - c. Laying
 - d. Leveling
 - e. Jointing
 - 3. Cleaning masonry
 - a. Sandblasting
 - b. Steam cleaning
 - c. Chemical cleaners
 - 4. Waterproofing
 - 5. Practical application

BLOCK V - PAINTING, DECORATING AND INTERIOR MAINTENANCE

- A. Painting**
- 1. Preparation of surface
 - 2. Selection of paint
 - a. Paint
 - b. Varnish

- c. Enamel
- 3. Selection of applicator
- 4. Application techniques
- 5. Practical application

B. Decorating

1. Tools and equipment

a. Nomenclature

- (1) Shears
- (2) Rollers
 - (a) Oval
 - (b) Flat
 - (c) Ribbed
- (3) Brushes
 - (a) Paste brush
 - (b) Smoothing brush
- (4) Paper hangers knives
- (5) Paper hangers straightedge
- (6) Sponges
- (7) Paste table

b. Use of tools and equipment

c. Care and storage

d. Practical application

2. Wall Coverings

a. Paperhanging

- (1) Prepare surface
 - (a) Remove old paper from wall
 - (b) Repair damaged places
 - (c) Repair cracks
- (2) Mixing paste
- (3) Cutting paper
- (4) Applying paste to paper
- (5) Applying paper to wall
- (6) Using smoothing brush
- (7) Trimming
 - (a) Knife
 - (b) Scissors
- (8) Practical application

C. Interior Maintenance

1. Plastering holes

a. Plaster

- (1) clean hole
- (2) Dovetail hole
- (3) Dampen edge of hole
- (4) Press in plaster
- (5) Smooth surface

b. Wood objects

- (1) Cracks and small holes
 - (a) Wood shellac
 - (b) Wood putty
 - (c) Plastic wood
- (2) Large defects
 - (a) Cutting out defect
 - (b) Installing piece of wood
 - (c) Filling in joints

- (d) Sanding
- 2. Replacing glass
 - a. Wood sash
 - (1) Wear gloves
 - (2) Removing old glass
 - (3) Removing glaziers and putty
 - (4) Priming area
 - (5) Fitting new glass
 - (6) Installing glaziers
 - (7) Installing putty
 - (8) Forming putty
 - b. Aluminum sash
 - (1) Removing plaster shim
 - (2) Removing old glass
 - (3) Remove old adhesive
 - (4) Coating frame with adhesive
 - (5) Fitting new glass
 - (6) Installing plastic shims
 - c. Work precautions and safety practices
 - d. Practical application
- 3. Replacing screen
 - a. Wood frames
 - (1) Removing molding
 - (2) Removing tacks/staples
 - (3) Removing screen
 - (4) Cleaning rust off frame
 - (5) Installing screen
 - (a) Pattern of tacking/staples
 - (b) Stretching
 - (c) Trimming
 - (6) Installing molding
 - b. Aluminum frames
 - (1) Removing plastic spline
 - (2) Removing screens
 - (3) Cutting new screen
 - (4) Rolling screen into groove
 - (5) Rolling plastic spline into groove
 - c. Work precautions and safety practices
 - d. Practice application

BLOCK VI - CAREER PLANNING

- A. Educational Opportunities
 - 1. Senior high schools
 - 2. Trade and industrial schools
 - 3. Apprenticeship programs
 - 4. Junior colleges
 - 5. Colleges and universities
- B. Related Occupations
 - 1. Masons
 - a. Bricklayer
 - b. Cement and concrete
 - c. Marble setter

- d. Stonemason
- e. Tile setter
- f. Terrazzo worker
- 2. Carpenters
 - a. Building construction
 - (1) Roofers
 - (2) Finishers
 - (3) Carpet layer
 - b. Cabinet maker
 - c. Glaziers
 - d. Lathers
 - e. Floor covering installers
- 3. Electrician
 - a. Inside wireman
 - b. Related trades
 - (1) Automotive
 - (2) Aircraft
 - (3) Telephone lineman
- 4. Plumbers
 - a. Pipefitters
 - b. Appliance installers
- 5. Heavy equipment operator
 - a. Power shovels
 - b. Cranes
 - c. Hoists
 - d. Pile drivers
 - e. Concrete mixers
 - f. Bulldozers
 - g. Paving machines
 - h. Heavy equipment maintenance
- 6. Layout men
 - a. Advertising
 - b. Drafting
 - c. Layout artist
 - (1) Commercial artist
 - (2) Advertising
 - d. Mechanical drawing
- 7. Construction foreman
 - a. Plant foreman
 - b. Working foreman
- 8. Painters and paperhangers
- 9. Plasters
- 10. Engineers
 - a. Civil
 - b. Project
 - c. Mechanical
 - d. Electrical
- 11. Architect
 - a. Design
 - b. Drafting
 - c. Specification writing
- 12. Project engineer

C. Employment Outlook

1. Apprenticeship
 - a. Continue education
 - b. Unions
2. Newspaper advertisements
3. Occupation outlook handbook
4. Florida State Employment Office
 - a. Dade County
 - b. State-wide

D. Wage Scale

1. Apprenticeship
2. Beginning wages
3. Occupational Outlook Handbook

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APPENDIX
QUINMESTER POST TEST SAMPLE

POST TEST

BLOCK I - CARPENTRY

1. The first strip of valley flashing should be at least
 - a. 12 inches wide
 - b. 14 inches wide
 - c. 18 inches wide
 - d. 22 inches wide
 - e. 26 inches wide
2. Materials used for exterior wall finishes include
 - a. Mineral fiber and wood
 - b. Hardboard and aluminum
 - c. Asphalt and plywood
 - d. Aluminum and asphalt
 - e. All of the above
3. Two methods of finishing interiors walls are
 - a. Cement and mortar
 - b. Plaster and solid wood
 - c. Lath and bond
 - d. Tile and slate
 - e. All of the above
4. When installing wood strip flooring you should
 - a. Have wood delivered four or five days before installing it
 - b. Install building paper over sub-floor before nailing the strip flooring down.
 - c. Nail the first strip along a wall 1/2 inch away from the wall.
 - d. Not come closer than 6 inches to an end joint of the preceding course
 - e. All of the above are correct.
5. The term "door swing" refers to
 - a. The opening space it provides
 - b. The closing space it requires
 - c. The type of hinges
 - d. The way the door opens either away from you or toward you.
 - e. None of the above.
6. Three types of paneling are
 - a. plastic, wallboard, and gypsum
 - b. Solid lumber, hardboard, and plywood
 - c. Plastic laminates, wallboard and gypsum
 - d. Hardboard, plastic, and asphalt material
 - e. Plywood, gypsum and wallboard

BLOCK II - PLUMBING MAINTENANCE

1. The build-up of sediment in hot water tanks can be prevented if
 - a. The tank is drained monthly
 - b. Nitric acid is added to the water
 - c. A bucket of water is drained out of the tank weekly

- d. The tank is flushed out yearly
 - e. The tapered plug removed every six months
2. Two methods of unclogging drains are
 - a. Snake and hot water
 - b. Flushing and plunger
 - c. Solvents and acids
 - d. Hot water and plunger
 - e. Forced water and solvents
 3. Chipped enamel should be repaired on fixtures
 - a. Because the sharp edges are dangerous
 - b. To give them good appearance
 - c. To prevent them from rusting
 - d. So they will not leak
 - e. So blending can be accomplished

BLOCK III - ELECTRICAL MAINTENANCE

1. The best method of checking a fuse is
 - a. To try it in another circuit
 - b. A continuity check
 - c. Visually check the melt bar
 - d. Compare it with a similar fuse
 - e. A voltage check
2. How many wires can be used when stringing number 14 wire in 1/2 inch conduit?
 - a. One
 - b. Two
 - c. Three
 - d. Four
 - e. Five
3. It is recommended that living rooms have
 - a. One ceiling light and five convenience outlets
 - b. Two ceiling lights if only three convenience outlets are installed
 - c. One ceiling light, convenience outlets and special wiring for door chimes
 - d. Two ceiling lights, four convenience outlets and special wiring
 - e. One ceiling light, one convenience outlets every four feet and telephone wiring.
4. How many wire/wires must be used when adding a new convenience outlet beyond the present outlet?
 - a. One
 - b. Two
 - c. Three
 - d. One green and one blue
 - e. One green, one blue, and one black

BLOCK IV - TROWEL TRADES

1. As a general rule concrete contains one part cement to how many parts of sand?
 - a. One
 - b. Two
 - c. Three
 - d. Four
 - e. One half
2. To insure bricks are properly aligned, the top of the bricks should be
 - a. In line with the middle of the level line
 - b. In line with the bottom of the line
 - c. In line with the top of the line
 - d. One inch from the level line
 - e. Touching the level line 1/8 inch above the line

BLOCK V - PAINTING, DECORATING AND INTERIOR MAINTENANCE

1. Before painting any surface you should
 - a. Sand it thoroughly
 - b. Clean the surface with soap and water
 - c. Fill all holes and cracks
 - d. Use an undercoat lighter than the color you are going to paint it
 - e. All of the above are correct
2. When cutting wall paper the strips should be cut about two inches longer than required
 - a. To allow for shrinkage
 - b. To allow for matching patterns
 - c. Because you may have measured wrong
 - d. To allow for trimming
 - e. So you can install the boarder
3. When replacing screen in an aluminum frame you should
 - a. Roll screen in all side and then roll in plastic spline
 - b. Roll screen around plaster spline and roll screen and plastic in together
 - c. Roll screen in one end and then roll in plastic spline
 - d. Roll screen in both ends and then roll in plastic spline
 - e. Roll screen in both sides and then roll in plastic spline

BLOCK VI - CAREER PLANNING

1. Occupations that can be found in the construction trade are
 - a. Carpenter, bricklayer, and plumber
 - b. Mason, electrician and heavy equipment operator
 - c. Tile setter, concrete worker, and roofer
 - d. Painters, wallpaper hangers, and plasterers
 - e. All of the above

2. Two places to look for employment are
 - a. Employment offices and magazines
 - b. Newspapers and bulletins
 - c. Magazines and bulletins
 - d. State offices and newspapers
 - e. Newspapers and employment offices

Careers in Construction, Building Maintenance and Allied Occupations

KEY TO POST TEST - QUIN II

BLOCK I

1. c
2. e
3. b
4. e
5. d
6. b

BLOCK II

1. c
2. e
3. c

BLOCK III

1. b
2. d
3. c
4. b

BLOCK IV

1. b
2. c

BLOCK V

1. e
2. d
3. e

BLOCK VI

1. e
2. e

INSTRUCTIONAL MATERIAL

DADE COUNTY PUBLIC SCHOOLS
1410 NORTHEAST SECOND AVENUE
MIAMI, FLORIDA 33132

VOCATIONAL EXEMPLARY PROGRAM

INSTRUCTIONAL PACKAGE

FOR

CAREERS IN CONSTRUCTION, BUILDING
MAINTENANCE AND ALLIED OCCUPATIONS

ORIENTATION

THE DIVISION OF
VOCATIONAL, TECHNICAL AND ADULT EDUCATION

OPPORTUNITIES FOR ADVANCEMENT ARE UNEXCELLED: PAY IS HIGH AND THE WORK REWARDING. TODAY CONSTRUCTION HAS BECOME A SECURE OCCUPATION, PROVIDING RETIREMENT PLANS, HOSPITALIZATION, PAID VACATION AND NUMEROUS OTHER FRINGE BENEFITS.

LISTED BELOW ARE SOME OF THE CONSTRUCTION TRADES, A BRIEF DESCRIPTION OF THE WORK PERFORMED, AS WELL AS THE BENEFITS AND THE ADVANTAGES OF EACH.

1. CARPENTRY
2. PLUMBING
3. ELECTRICAL
4. AIR CONDITIONING
5. BLOCK MASON
6. PLASTER
7. CONCRETE FINISHER
8. LABORS
9. IRON WORKERS
10. CABINETS AND MILLWORK
11. GLAZZERS
12. LATHERS
13. PAINTERS
14. SHEET METAL
15. ROOFERS

CONSTRUCTION: TO MAKE OR FORM BY COMBINING PARTS.

TWO TO THREE MILLION YOUNG PEOPLE ARE LOOKING FOR THEIR FIRST JOBS EVERY YEAR. THE SEMI-SKILLED AND THE UNSKILLED APPLICANTS HAVE LESS AND LESS CHANCE. THEY ARE BECOMING A SMALLER PERCENTAGE OF THE TOTAL LABOR FORCE BECAUSE MACHINES ARE TAKING OVER THEIR WORK.

THE SKILLED WORKER IS IN A POSITION TO HOLD HIS OWN REGARDLESS OF WHAT CHANGES TAKE PLACE. ALTHOUGH HE MAY FIND IT NECESSARY TO REVISE AND UP-DATE HIS SKILLS IN THE FAST-MOVING WORLD AHEAD, HE WILL BE ABLE TO DO IT BECAUSE HIS THOROUGH TRAINING IS THE BEST POSSIBLE FOUNDATION FOR MOVING ON TO NEW IDEAS.

CONSTRUCTION REQUIRES A HIGHER PROPORTION OF SKILLED WORKERS THAN ANY OTHER INDUSTRY--MORE THAN 1 OUT OF EVERY 2 MUST BE SKILLED. THIS COMPARES WITH LESS THAN 1 IN 5 IN MANUFACTURING AND TRANSPORTATION, AND FEWER THAN 1 IN 10 IN OTHER INDUSTRIES.

EMPLOYMENT IN THE CONSTRUCTION INDUSTRY IS EXPECTED TO GROW AT A MORE RAPID RATE THAN THE FOLLOWING INDUSTRIES: FINANCE, INSURANCE AND REAL ESTATE; WHOLESALE AND RETAIL TRADES ; MANUFACTURING, TRANSPORTATION, COMMUNICATION AND PUBLIC UTILITIES.

CONSTRUCTION USES 52% OF THE SKILLED WORKERS IN THE UNITED STATES TODAY, COMPARED TO ONLY 18.5% IN MANUFACTURING AND TRANSPORTATION.

DUE TO THE RAPIDLY EXPANDING POPULATION IN THE STATE OF FLORIDA, THE CONSTRUCTION INDUSTRY OF DADE COUNTY HAS BECOME ONE OF THE LARGEST IN THE WORLD (THE MORE PEOPLE IN AN AREA THE MORE THE NEED FOR SCHOOLS, HOMES, HOTELS, ROADS AND OTHER FACILITIES). ALONG WITH THE GROWTH IN OVER ALL NUMBER EMPLOYED THE CONSTRUCTION INDUSTRY HAS MADE GREAT STRIDES IN WORKER INCOME ALSO. TODAY CONSTRUCTION RANKS BELOW ONLY THE AUTOMOTIVE INDUSTRY AND THE PROFESSIONS IN AVERAGE ANNUAL INCOME.

ORIENTATION

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APPRENTICESHIP: WHAT IT MEANS

THE LEARNING OF A SKILLED TRADE IS BY NO MEANS AN EASY TASK NOR IS IT A SHORT TIME PROPOSITION. IN THIS RESPECT THE SKILL AND KNOWLEDGE THAT ONE MUST LEARN BECOMES A COMPETENT WORKER IS NOT UNDER THE KNOWLEDGE THAT THE PROFESSIONAL PERSON LEARNS AT COLLEGE OR UNIVERSITY. FOR THIS REASON YOU SHOULD BE AWARE OF THE TERM "APPRENTICESHIP" AND WHAT IT MEANS TO YOU AND THE TRADE OF YOUR CHOICE.

APPRENTICESHIP MAY BE DEFINED AS " A SYSTEM OF LEARNING BY DOING AND EARNING WHILE LEARNING". IT IS BY NO MEANS A MODERN TERM AND FOR THIS REASON IT MIGHT BE WORTH WHILE TO EXPLORE OF A MINUTE THE HISTORY AND BACKGROUND OF THIS TYPE OF TRAINING.

APPRENTICESHIP TRAINING WAS BROUGHT TO THIS COUNTRY BY OUR FOREFATHERS FROM ENGLAND AND OTHER EUROPEAN COUNTRIES. THERE IS EVIDENCE OF EARLY APPRENTICESHIPS DATING BACK TO THE COLONIAL DAYS OF 1640 IN NEW ENGLAND. SUCH APPRENTICESHIPS WERE FAR DIFFERENT FROM THOSE OF TODAY AND THE APPRENTICE RECEIVED SMALL COMPENSATION FOR HIS SERVICES.

THE FOLLOWING IS THE WORDING OF A CTURAL APPRENTICESHIP INDENTURE OF COLONIAL DAYS:

"KNOW ALL MEN I, _____ WITH THE CONSENT
OF _____ OF WINDSOR UNTO WHOSE CONTODY AND
CARE AT WHOSE CHARGE I WAS BROUGHT OVER OUT OF ENGLAND
INTO NEW ENGLAND, DOE BYNY MYSELF AS A APPRENTISE
FOR EIGHT YEERES TO SERVE _____ OF SPRINGFIELD
HIS HEIRES AND ASSIGNS IN ALL MANNER OF LAWFUL
EMPLOYMT UNTO THE FULL EST OF EIGHT YEERES
BEGINNINGE THE 29 DAY OF SEPT 1640 AND THE SAID
_____ MEAT DRIKE AND CLOTHING FITTING
SUCH AN APPRENTISE AND AT THE END OF HIS TYME ONE
NEW SUITE OF APPRELL AND FORTY SHILLINGS IN NONY:
SUBSCRIBED THIS 28 OCTOBER 1640"

AS ONE CAN EASILY SEE THE CHANCE TO LEARN A TRADE IN THE EARLY DAYS OF OUR COUNTRY WAS CONSIDERED QUITE AN HONOR IN ITSELF FOR WHICH THE APPRENTICE WAS EXPECTED TO GIVE HIS "DEVOTED SERVICES". APPRENTICESHIP HAS DEFINITELY ADVANCED FAR BEYOND THE OLD WAYS, UNTIL TODAY, INSTEAD OF WORKING FOR FOOD, CLOTHING AND A FEW SHILLINGS, THE APPRENTICE RECEIVES A SUBSTANTIAL WAGE, WHICH INCREASES EVERY SIX MONTHS OF PRE-DETERMINED NUMBER OF HOURS OF TRAINING, HE WORKS ONLY A 40 HOUR WEEK INSTEAD OF SLAVING FOR A MASTER IN A MENTAL CAPACITY HE RECEIVES "ON THE JOB" AND CLASSROOM INSTRUCTION.

THE TRADES(SOMETIMES CALLED CRAFTS) THEMSELVES HAVE ALWAYS BEEN LARGELY A FAMILY TRADITION. FATHER HAVE TAUGHT THEIR SONS THE CRAFTS AND SONS HAVE TAUGHT THEIR SONS. THIS WAS THE CASE WHEN BENJAMIN FRANKLIN BECAME INDENTURED IN 1718 AT THE AGE OF 12 TO HIS OLDER BROTHER JAMES. THE TERMS OF BENJAMIN FRANKLIN'S APPRENTICESHIP WERE QUITE LIBERAL, HOWEVER AS THE PROVIDED THAT HE WOULD RECEIVE JOURNEYMAN'S WAGES DURING THE LAST TWO YEARS OF HIS NINE YEARS TERM. HE DID NOT FINISH HIS TERM HOWEVER, BECAUSE OF A QUARREL WITH JAMES WHO, HE SAYS, SOMETIMES BEAT HIM.

APPRENTICE TRAINING PROGRAM

THE APPRENTICE TRAINING PROGRAM WAS INAUGURATED AT THE LINDSEY HOPKINS EDUCATION CENTER IN AUGUST OF 1945, WITH COURSE OFFERING IN FIVE APPRENTICEABLE AREAS: CARPENTRY, ELECTRICAL, PLASTERING, LATHING AND PLUMBING. THE BEGINNING ENROLLMENT IN THESE FIVE BUILDING TRADE AREAS WAS 145 APPRENTICES.

THE POSTWAR BUILDING BOOM WAS SOON REFLECTED IN A STEADY GROWTH OF THE APPRENTICE TRAINING PROGRAM, AND DURING THE PAST TWENTY YEARS THIS PROGRAM HAS KEPT PACE WITH THE INCREASING CONSTRUCTION AND MECHANICAL NEEDS OF INDUSTRIAL AND RESIDENTIAL DADE COUNTY. AT THIS TIME, 1800 APPRENTICES ARE ENROLLED IN THE 16 APPRENTICEABLE AREAS, CHIEFLY IN THE BUILDING AND MACHINE TRADE AND PRESENT TRENDS INDICATE THAT 3000 WILL BE ENROLLED BY JANUARY OF 1972.

HOUSING FACILITIES

CLASSES ARE HOUSED IN SEVEN SENIOR HIGH SCHOOLS AND IN SIX OTHER EDUCATIONAL FACILITIES THROUGHOUT DADE COUNTY THAT HAVE BEEN MADE AVAILABLE THROUGH THE EFFORTS OF PROGRESSIVE LABOR AND MANAGEMENT APPRENTICESHIP COMMITTEES.

THE SERVICES OF 64 FULL-TIME AND PART-TIME INSTRUCTORS ARE REQUIRED AT THE PRESENT TIME FOR THIS PROGRAM.

ENTRANCE REQUIREMENTS

TO BE ENROLLED IN THE APPRENTICE PROGRAM, THE APPLICANT MUST HAVE A HIGH SCHOOL DIPLOMA AND MUST PROVIDE GOOD CHARACTER REFERENCES. HE MUST BE FROM 18 TO 26 YEARS OF AGE, AND PASS A PHYSICAL EXAMINATION.

AWARDS AND ACTIVITIES

THE LEVEL OF EFFICIENCY REACHED BY GRADUATING APPRENTICES IS DEMONSTRATED BY THE NUMBER OF STATE AND NATIONAL AWARDS WON BY THEM. THE AWARDS AT THE STATE LEVEL ARE SPONSORED BY THE CARPENTRY, PLASTERING AND BRICKLAYING, PLUMBING AND AIR CONDITIONING AND REFRIGERATION COMMITTEES. AT THE NATIONAL LEVEL, A NATIONAL GAS FITTERS AWARD AS WELL AS THE SHEETMETAL AWARD HAS BEEN WON.

ALL APPRENTICE GROUPS PARTICIPATE IN AN ANNUAL GRADUATION EVENT THAT INCLUDES A BANQUET AND DANCE, WITH FEDERAL STATE AND COUNTY OFFICIALS AS THEIR GUEST.

ORIENTATION

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CARPENTRY: "THE ART OF WORKING WITH WOOD, IN THE CONSTRUCTION OF BUILDINGS IN WHICH MEN LIVE OR WORK. THE MAKING OF FURINTURE AND MANY OTHER DEVICES OF WOOD, TO HELP MAN ADAPT HIMSELF TO HIS ENVIROMENT."

TODAY THE MODERN CARPENTER IS A RESPECTED CRAFTSMAN. HIS WORK IS BASIC TO ALL THE OTHER BUILDING TRADES: HE IS THE FIRS AND THE LAST MAN ON THE JOB. HE IS CONCERNED WITH THE SAFETY AND COMFORT OF WORKERS ON THE JOB AS WELL AS THE PERSONS WHO WILL USE AND OCCUPY THE BUILDINGS.

CARPENTRY, TODAY AS IN THE PAST, IS ONE OF THE CORNER STONES OF OUR WAY OF LIFE.

AT ONE TIME THE CARPENTER'S WORK WAS ALMOST ENTIRELY WITH WOOD. HOWEVER, IN RECENT YEARS MANY SUBSITITUES FOR WOOD HAVE BEEN PUT ON THE MARKET, AND IN ORDER TO PROTECT HIS INTERESTS THE CARPENTER HAS CLAIMED THE RIGHT TO WORK IN MANY OF THE NEWER MATERIALS, ON THE BASIS THAT SUCH WORK REQUIRES THE USE OF CARPENTRY TOOLS.

HOWEVER, THE CARPENTER'S WORK IS NOT CONFINED TO THE ERECTION OF BUILDINGS: THAT IS ONLY ONE PHASE OF CARPENTRY. CARPENTERS ARE EMPLOYED IN THE BUILDING OF BRIDGES, PIERS, DOCKS AND WHARFS. A LARGE NUMBER OF MEN ARE EMPLOYED AS BOAT OR SHIP CARPENTER, WORK REQUIRING TRAINING WHICH IS DIFFERENT FROM THAT FOR BUILDING AND CONSTRUCTION WORK.

THE CARPENTER IS THE KEY MAN IN THE BUILDING FIELD AND MUST BE A VERSATILE PERSON. PRACTICALLY EVERY PHASE OF BUILDING REQUIRES HIS SKILL AND KNOWLEDGE. HE IS OF THE UTMOST IMPORTANCE IN RUNNING ACCURATE LINES FOR THE FOUNDATION AND IN BUILDING THE FORMS THAT WILL PERMIT THE POURING OF TRUE FOUNDATION WALLS.

HE TAKES PART IN EVERY PHASE OF THE BUILDING OF THE STRUCTURE AND AFTER THE OWNER HAS MOVED IN HE COMES BACK TO MAKE MINOR ADJUSTMENTS IN DOORS, WINDOWS AND HARDWARE.

CONSIDERING THE KEY IMPORTANCE OF THE CARPENTER, AND THE RESPONSIBILITY ASSUMED BY THE CARPENTER, IT IS JUST THAT CARPENTERS BE CALLED "LABOR'S ARISTOCRACY". CARPENTRY IS AN ANCIENT AND PROUD CRAFT. THERE IS PRIDE AND DIGNITY IN BEING A SAFE AND COMPETENT CRAFTSMAN.

THE PRACTICAL WAY TO ENTER THE TRADE IS THROUGH AN APPRENTICESHIP PROGRAM.

A STUDENT INTERESTED IN CARPENTRY SHOULD TAKE ALL THE WORK OFFERED IN DRAFTING, MATHEMATICS AND SCIENCE IN JUNIOR AND SENIOR HIGH SCHOOL.

IF THIS TRAINING IS FOLLOWED BY TWO OR THREE YEARS OF VOCATIONAL TRADE TRAINING AND AN APPRENTICESHIP AFTER GRADUATION, THE YOUNG CARPENTER SHOULD BE WELL QUALIFIED AS A JOURNEYMAN.

QUALIFICATIONS:

YOU MUST HAVE MORE THAN ORDINARY ABILITY TO WORK WITH YOUR HANDS AS WELL AS YOUR HEAD, YOU DO NOT NEED EXCEPTIONAL PHYSICAL STRENGTH, BUT YOU DO NEED A HEALTHY, TOUGH PHYSIQUE, AGILITY AND A GOOD SENSE OF BALANCE.

BEING "QUICK AT FIGURES" AND HAVING AN EYE FOR STRAIGHTNESS OF LINE AND THE RIGHTNESS OF PROPORTIONS ARE HELPFUL. A GOOD MATH BACKGROUND IS VERY HELPFUL TO BE A GOOD CRAFTSMAN AND FOR ADVANCEMENT IN THE TRADE.

CARPENTER APPRENTICES:

THE APPRENTICE MUST BE BETWEEN THE AGES OF 18 AND 24 YEARS IF A NON-VETERAN, IF A VETERAN HE MUST BE UNDER 30 YEARS OF AGE. EACH APPLICANT IS REQUIRED TO PASS AN APTITUDE TEST GIVEN BY THE FLORIDA INDUSTRIAL COMMISSION. HIGH SCHOOL EDUCATION OR ITS EQUIVALENT IS REQUIRED.

THE APPLICANT MUST BE EMPLOYED IN THE TRADE BEFORE HE CAN BE CONSIDERED FOR APPRENTICESHIP.

LENGTH OF THE APPRENTICESHIP IS FOUR YEARS, BOTH ON THE JOB AND IN RELATED CLASSES, WITH A MINIMUM OF 144 HOURS PER YEAR OF RELATED INSTRUCTIONS.

THE APPRENTICE IS GIVEN THE NECESSARY RELATED INSTRUCTION WHICH, WITH HIS PRACTICAL TRAINING ON THE JOB, WILL QUALIFY HIM AS A CARPENTER. AS A JOURNEYMAN IN THIS TRADE HE WILL SPECIALIZE IN THE CONSTRUCTION OF NEW AND OLD BUILDINGS MADE OF WOOD OR WOOD SUBSTITUTES AND IN THE MAINTENANCE AND REPAIR OF THE MANY TYPES OF STRUCTURES HE IS EXPECTED TO BUILD, INCLUDING MILLWORK, CABINET WORK, AND MILLWRIGHT WORK.

CABINET AND MILLWORK:

THIS COURSE IN RELATED INSTRUCTION IS DESIGNED FOR APPRENTICES WHO ARE BETWEEN THE AGES OF 18 TO 26 YEARS, ENGAGED IN LEARNING CABINET AND MILLWORK, AND INDENTURED WITH THE CABINET AND MILLWORK JOINT APPRENTICESHIP COMMITTEE.

THE LENGTH OF THE COURSE IS FOUR YEARS, WITH NOT LESS THAN 144 HOURS PER YEAR OF RELATED INSTRUCTION, CONCURRENT WITH ON-THE-JOB TRAINING.

ALL APPRENTICES, BEFORE BEING INDENTURED, ARE THOROUGHLY SCREEDED AND GIVEN APTITUDE TEST BY A COMMITTEE OF SIX MEN, THREE FROM LABOR AND THREE FROM MANAGEMENT.

COURSE CONTENT CONSISTS OF MATHEMATICS, BLUEPRINTS, FRAMING OF KITCHEN CABINETS, VARIOUS OTHER CABINETS, SINK AND WALL, SIMPLE DOORS, GARAGE DOORS-DOWELL TYPE. SLIDING DOOR CASINGS AND THE BUILDING OF FURNITURE AND FIXTURES.

ORIENTATION

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BOAT BUILDING:

THE APPRENTICE SHALL BE NOT LESS THAN 18 YEARS NOR MORE THAN 30 YEARS OF AGE. HE MUST BE EMPLOYED BY A CONCERN APPROVED BY THE DADE COUNTY WORKERS JOINT APPRENTICESHIP COMMITTEE, AND INDENTURED FOR TRAINING WITH THIS COMMITTEE.

THE LENGTH OF THE COURSE IS FOUR YEAR, OR A MINIMUM OF 144 HOURS PER YEAR EACH YEAR OF APPRENTICESHIP, CONCURRENT WITH 4000 HOURS OF ON-THE-JOB TRAINING.

ALL APPRENTICES, BEFORE BEING INDENTURED, ARE THOROUGHLY SCREENED AND GIVEN APTITUDE TESTS BY A COMMITTEE OF SIX MEN, THREE FROM LABOR AND THREE FROM MANAGEMENT.

COURSE CONTENT CONSISTS OF ALL RELATED INFORMATION NECESSARY TO ENABLE THE APPRENTICE TO LEAVE THE CLASS AT THE CONCLUSION OF HIS TWO YEARS OF WORK AND RELATED TRAINING, AND ENTER THE FIELD AS A FULL-FLEDGE JOURNEYMAN. INFORMATION IS GIVEN RELATIVE TO THE HISTORY OF THE TRADE, BLUEPRINT READING, MATHEMATICS, STRUCTURAL ERECTING, RIGGING, MAINTENANCE OF EQUIPMENT, AND WELDING.

ORIENTATION

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PLUMBER:

PLUMBING IS A PROUD CALLING. THE INDUSTRY PRESENTS MANY OUTSTANDING OPPORTUNITIES FOR ADVANCEMENT AND SUCCESS. SKILLED MECHANICS IN THIS INDUSTRY ARE AMONG THE HIGHEST PAID IN ANY CRAFT. LATER, YOU MAY ENTER INTO BUSINESS AS A PLUMBING CONTRACTOR. IN THIS FIELD, YOUR INITIATIVE AND ABILITY CAN TAKE YOU FAR.

BUT THERE ARE OTHER IMPORTANT PHASES TO PLUMBING YOU WILL HAVE AND OPPORTUNITY OF RENDERING A REAL SERVICE TO MANKIND THROUGH PROVIDING COMFORT, SAFETY AND CONVENIENCE, AS WELL AS CONTRIBUTING TOWARD BETTER PUBLIC HEALTH.

THE PIPING OF WATER SUPPLY AND SAFE DISPOSAL OF WATERBORN WASTE HAS MEANT MUCH TO THE PROGRESS OF CIVILIZATION. TODAY, AS THE RESULT OF THE PLUMBER'S WORK, WATER IS PIPED IN ABUNDANT SUPPLY TO WHERE IT IS NEEDED FOR INDUSTRY, AGRICULTURE, AND NORMAL LIVING PURPOSE.

DO YOU REALIZE WHAT THIS MEANS IN THE CONSTRUCTION OF MODERN BUILDING? BEFORE CONSTRUCTION CAN BEGIN, A WATER SUPPLY MUST BE EXTENDED TO THE SITE. BUILDERS NEED WATER FOR MANY REASONS--- FOR MIXING MORTAR AND FOR MIXING CONCRETE, DRINKING WATER FOR THE WORKMEN, WATER FOR PLASTERING AND CEMENT WORK. LAST, BUT NOT LEAST AN ADEQUATE WATER SUPPLY MUST BE PROVIDED FOR USE IN THE FINISHED BUILDING.

BUT THE WATER SUPPLY IS NOT THE ONLY FUNCTION OF THE PLUMBER. OF GREAT IMPORTANCE ALSO IS THE HANDLING OF WATER AFTER IT HAS SERVED ITS PURPOSE, TOGETHER WITH THE DISPOSAL OF WATER-BORNE WASTE. INTRICATE PIPING INSTALLATION FOR DRAINAGE SYSTEMS AND SEWAGE DISPOSAL PROJECTS ARE ESSENTIAL. THEY, TOO, ARE A PART OF PLUMBING.

THERE ARE RARELY TWO PLUMBING JOBS EXACTLY ALIKE. THUS, IT IS BECOMING MORE AND MORE ESSENTIAL THAT THE MEN WHO FOLLOW THE ANCIENT AND YET EVER-NEW CRAFT OF PLUMBING BE HIGHLY SKILLED AND INTELLIGENT. THEY NEED THE ABILITY TO PLAN AND THINK AHEAD, A TRAIT WHICH DEVELOPS AS YOU PROCTICE YOUR TRADE. THERE ARE ENDLESS OPPORTUNITIES IN THIS INDUSTRY TO BECOME HIGHLY RESPECTED, SUCCESSFUL CITIZENS AND LEADERS IN THE COMMUNITIES OF OUR COUNTY.

THERE IS ONLY ONE WAY TO ENTER THE PLUMBING TRADE, THAT IS THROUGH AN ORIGINIZED APPRENTICESHIP PROGRAM.

ORIENTATION

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PLUMBERS APPRENTICES:

THE APPRENTICE MUST BE BETWEEN THE AGES OF 18 AND 21 YEARS WITH A HIGH SCHOOL DIPLOMA. HE MUST BE REGULARLY EMPLOYED AS AN APPRENTICE ENGAGED AT PLUMBING WORK IN AN APPROVED PLUMBING ESTABLISHMENT.

LENGTH OF THE COURSE IS FIVE YEARS, WITH FOUR HOURS A WEEK FOR A MINIMUM OF 160 HOURS A YEAR IN RELATED INSTRUCTION REQUIRED.

SUBJECT MATTER FOR THE COURSE IS BASED ON THE NATIONALLY ACCEPTED MATERIAL CONTAINED IN THE SEVEN-VOLUME SET OF "PLUMBING APPRENTICE TRAINING".

ELECTRICIANS:

CONSTRUCTION ELECTRICIANS LAY OUT, ASSEMBLE, INSTALL AND TEST ELECTRICAL FIXTURES, APPARATUS AND WIRING USED IN ELECTRICAL SYSTEMS. THE SYSTEMS ONCE INSTALLED, ARE USED TO PROVIDE HEAT, LIGHT, POWER, AIR CONDITIONING, AND REFRIGERATION IN RESIDENCES, OFFICE BUILDINGS, FACTORIES, HOSPITALS, SCHOOLS AND OTHER STRUCTURES. CONSTRUCTION ELECTRICIANS ALSO INSTALL AND CONNECT ELECTRICAL MACHINERY, ELECTRONIC EQUIPMENT, CONTROLS AND SIGNAL AND COMMUNICATIONS SYSTEMS.

MAINTENANCE ELECTRICIANS DO WORK WHICH IS SIMILAR IN MANY RESPECTS TO THAT PERFORMED BY CONSTRUCTION ELECTRICIANS.

CONSTRUCTION ELECTRICIANS USUALLY FOLLOW BLUEPRINTS AND SPECIFICATION WHEN INSTALLING VARIOUS ELECTRICAL COMPONENTS. IF THERE IS NO ELECTRICAL DRAWING, THE ELECTRICIAN TERMINATES THE INCOMING ELECTRICAL SERVICE INTO A CENTRAL LOAD CENTER WITH OVERLOAD PROTECTIVE DEVICES AND INSTALLS INTERIOR CIRCUITS AND OUTLETS ACCORDING TO THE AMOUNT OF ELECTRICAL CURRENT EXPECTED TO BE USED IN THE VARIOUS SECTIONS OF THE BUILDING. HE INSTALLS FUSED OR CIRCUIT BREAKERS OF THE PROPER RATING IN THE INCOMING AND INTERIOR CIRCUITS TO PREVENT OVERLOADING, WHICH CAUSES OVERHEATING OF WIRES, APPLIANCES AND MOTORS. THE CONSTRUCTION ELECTRICALIAN MUST KNOW AND FOLLOW NATIONAL ELECTRICAL CODE REGULATIONS AND IN ADDITION MUST FULFILL STATE, COUNTY AND MUNICIPAL REGULATIONS.

MOST CONSTRUCTION ELECTRICIANS WORK FOR ELECTRICAL CONTRACTORS. SUBSTANTIAL NUMBERS ARE SELF-EMPLOYED. OTHERS WORK FOR GOVERNMENT AGENCIES OR BUSINESS ESTABLISHMENTS THAT DO THEIR OWN CONSTRUCTION ELECTRICAL WORK. CONSTRUCTION ELECTRICIANS USUALLY WORK FOR A LARGE NUMBER OF DIFFERENT EMPLOYERS DURING THEIR WORK LIFE BECAUSE OF THE INTERMITTENT NEEDS OF INDIVIDUAL CONTRACTORS.

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HOWEVER, MANY CONSTRUCTION ELECTRICIANS WORK FOR THE SAME ELECTRICAL CONTRACTORS FOR SEVERAL YEARS. DURING A SINGLE YEAR, A CONSTRUCTION ELECTRICIAN MAY WORK FOR AN ELECTRICAL CONTRACTOR IN THE CONSTRUCTION OF NEW HOMES OR OFFICE BUILDINGS. FOR A MANUFACTURING FIRM IN REMODELING ITS PLANTS OR OFFICES OR HE MAY DO ELECTRICAL REPAIRS FOR HOMEOWNERS OR BUSINESS FIRMS.

HOURLY WAGE RATES OF CONSTRUCTION ELECTRICIANS ARE AMONG THE HIGHEST IN THE SKILLED BUILDING TRADES. FURTHERMORE, BECAUSE OF THE SEASONAL NATURE OF CONSTRUCTION WORK AFFECTS ELECTRICIANS LESS THAN MOST OTHER CONSTRUCTION WORKERS, THEIR ANNUAL EARNINGS GENERALLY ARE AMONG THE HIGHEST IN THE BUILDING TRADES.

ELECTRICAL APPRENTICES:

THE APPRENTICE MUST BE BETWEEN THE AGES OF 18 AND 26 OR 30 IF A VETERAN. HE MUST BE EMPLOYED IN AN ELECTRICAL CONTRACTOR'S SHOP WHICH HAS BEEN APPROVED FOR APPRENTICE TRAINING BY THE MIAMI JOINT ELECTRICAL APPRENTICESHIP COMMITTEE AND HE MUST BE INDENTURED FOR TRAINING WITH THIS COMMITTEE.

THE LENGTH OF THE COURSE IS FIVE YEARS, OR 720 HOURS OF RELATED TRAINING CONCURRENT WITH 10,000 HOURS OF ON-THE-JOB PRACTICAL TRAINING.

ALL APPRENTICES, BEFORE BEING INDENTURED, ARE THOROUGHLY SCREENED AND GIVEN APTITUDE TEST BY A COMMITTEE OF EIGHT MEN, FOUR FROM MANAGEMENT. THIS SCREENING IS NECESSARY TO AVOID WASTE OF THE STATE'S OR THE CONTRACTOR'S FUNDS.

THE APPRENTICE MUST BE A HIGH SCHOOL GRADUATE OR HAVE EQUIVALENT EDUCATIONS.

COURSE CONTENT CONSISTS OF ALL THE RELATED INFORMATION NECESSARY TO ENABLE THE APPRENTICE TO LEAVE THE COURSE AT THE CONCLUSION OF HIS FIVE YEARS OF WORK AND ENTER THE FIELD AS A FULL-FLEDGED JOURNEYMAN. UNITS COVERED INCLUDE BASIC ELECTRICITY, MATHEMATICS, BLUEPRINT READING AND ESTIMATING, AND CONSTRUCTION RULES AND TECHNIQUES FOR THE INSTALLATION OF ELECTRIC WIRING FOR LIGHT, HEAT AND POWER.

AIR CONDITIONING AND REFFIGERATION

QUALIFICATIONS FOR APPRENTICESHIP: ALL APPLICANTS MUST BE BETWEEN THE AGES OF 18 AND 25 YEARS. THEY MUST SATISFY THE LOCAL JOINT APPRENTICESHIP COMMITTEE THAT THEY HAVE THE ABILITY AND APTITUDE TO MASTER THE SKILLS OF THE TRADE AND HAVE SUFFICIENT EDUCATION TO SATISFACTORILY COMPLETE THE REQUIRED HOURS OF RELATED INSTRUCTION. APPLICANTS MUST BE HIGH SCHOOL GRADUATES. THEY MUST BE CITIZENS OF THE UNITED STATES OR CANADA, PHYSICALLY ABLE TO PERFORM THE WORK REQUIRED OF THE TRADE, SUCCESSFULLY PASS AN I.Q. TEST AND AN EDUCATIONAL EQUIVALENCY TEST AND MEET SUCH OTHER ENTRANCE REQUIREMENTS AS MAY BE REQUIRED BY THE LOCAL COMMITTEE. A PHYSICAL EXAMINATION BY A DOCTOR, SELECTED BY THE COMMITTEE, IS REQUIRED. ALL APPLICANTS SHALL BE AFFORDED EQUAL EMPLOYMENT OPPORTUNITY REGARDLESS OF RACE, CREED, COLOR, SEX OR NATIONAL ORIGIN.

EXCEPTIONS MAY BE MADE BY THE JOINT APPRENTICESHIP COMMITTEE FOR THOSE BEYON THE AGE LIMIT WHO HAVE BEEN ENGAGED IN THE TRADE OR WHO HAVE UNUSUAL QUALIFICATION. EXCEPTIONS MAY BE MADE FOR VETERANS, BUT EACH CASE SHALL BE JUDGED ON ITS OWN MERITS.

EACH APPRENTICE SHALL ATTEND CLASSES IN RELATED TECHNICAL INSTRUCTION FOR NOT LESS THAN FOUR HOURS WEEKLY, 144 HOURS PER YEAR, DURING EACH YEAR OF HIS TERM OF APPRENTICESHIP, OR A MINIMUM OF 720 HOURS.

INCLUDED IN THE COURSE CONTENT ARE UNITS ON THE HISTORY AND DEVELOPMENT OF MECHANICAL REFRIGERATION AND AIR CONDITIONING, COMPOSITION AND PRESERVATION OF FOOD, LATENT HEAT AND REFRIGERATION, TYPES OF REFRIGERATING SYSTEMS, CONDENSERS, COOLING UNITS, REFRIGERATING MACHINE LAYOUT, PIPES AND TUBING, PRESSURE-TEMPERATURE CHARTS, REFRIGERATOR CABINET CONSTRUCTION, MULTIPLE INSTALLATIONS, INTRODUCTION TO AIR CONDITIONING, TERMINOLOGY, MEASURING INSTRUMENTS, CLASSIFICATION OF AIR CONDITIONING PROCESSES, REFRIGERATING PLANT CONDENSING UNITS, AIR COOLING METHODS OF APPLICATION, AIR CIRCULATION AND DISTRIBUTION, EVAPORATIVE CONDENSERS, REVERSE CYCLE OF REFRIGERATION AND MISCELANEOUS EQUIPMENT, AIR CONDITIONS WITH ICE AND EVAPROATIVE COOLING, INSTALLATION, SAFETY AND PRECAUTIONS, AND BLUEPRINT READING.

ORIENTATION

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GLAZIER APPRENTICES:

THE APPRENTICE MUST BE BETWEEN THE AGES OF 18 AND 25 YEARS, ENGAGED IN LEARNING THE GLAZIER TRADE, AND INDENTURED WITH THE GLAZIERS JOINT APPRENTICESHIP COMMITTEE.

THE LENGTH OF THE COURSE IS THREE YEARS, WITH NOT LESS THAN 144 HOURS PER YEAR OF RELATED INSTRUCTION, CONCURRENT WITH ON-THE-JOB TRAINING.

APPRENTICES, BEFORE BEING INDENTURED, ARE THOROUGHLY SCREENED AND GIVEN APTITUDE TESTS BY THE COMMITTEE CONSISTING OF SIX MEN, THREE FROM LABOR AND THREE FROM MANAGEMENT. THEY MUST HAVE A HIGH SCHOOL DIPLOMA OR EQUIVALENT.

COURSE CONTENT INCLUDES RELATED INSTRUCTION FOR INSTALLING AND REPLACING GLASS IN WOOD AND STEEL SASHES AND SKYLIGHTS, SAFETY FACTORS IN ERECTING PATENT SCAFFOLDING, OPERATION PRILLIMINARY TO INSTALLATIONS, STRUCTURAL GLASS AND TEMPERED GLASS DOORS, AND INSTALLING MIRRORS AND MISCELLANEOUS GLASS FIXTURES, TOOLS AND THEIR USES.

ORIENTATION

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IRON WORKER APPRENTICES:

THE APPRENTICE SHALL BE NOT LESS THAN 18 YEARS, NOR MORE THAN 30 YEARS, OF AGE. HE MUST BE EMPLOYED BY A CONCERN APPROVED BY THE DADE COUNTY IRON WORKER JOINT APPRENTICESHIP COMMITTEE AND INDENTURED FOR TRAINING WITH THIS COMMITTEE.

THE LENGTH OF THE COURSE IS TWO YEARS, OR A MINIMUM OF 144 HOURS PER YEAR, EACH YEAR OF APPRENTICESHIP, CONCURRENT WITH 4000 HOURS OF ON-THE-JOB TRAINING.

ALL APPRENTICES, BEFORE BEING INDENTURED, ARE THOROUGHLY SCREENED AND GIVEN APTITUDE TESTS BY A COMMITTEE OF SIX MEN, THREE FROM LABOR AND THREE FROM MANAGEMENT.

COURSE CONTENT CONSISTS OF ALL RELATED INFORMATION NECESSARY TO ENABLE THE APPRENTICE TO LEAVE THE CLASS AT THE CONCLUSION OF HIS TWO YEARS OF WORK AND RELATED TRAINING AND ENTER THE FIELD AS A FULL-FLEDGED JOURNEYMAN. INFORMATION IS GIVEN RELATIVE TO THE HISTORY OF THE TRADE, BLUEPRINT READING, MATHEMATICS, ORNAMENTAL REINFORCING, STRUCTURAL ERECTING, RIGGING, MAINTENANCE OF EQUIPMENT AND WELDING.

ORIENTATION

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LATHER APPRENTICES:

THE APPRENTICE SHALL BE BETWEEN THE AGES OF 18 AND 26 YEARS OF AGE, MUST BE EMPLOYED BY A CONCERN APPROVED BY THE LATHERS JOINT APPRENTICESHIP COMMITTEE, AND INDENTURED FOR TRAINING WITH THIS COMMITTEE, WHICH CONSISTS OF THREE PERSONS FROM LABOR AND THREE FROM MANAGEMENT.

ALL APPRENTICES, BEFORE BEING INDENTURED, ARE THOROUGHLY SCREENED AND GIVEN APTITUDE TEST BY THE COMMITTEE.

THE LENGTH OF THE COURSE IS THREE YEARS, WITH A MINIMUM OF 144 HOURS IN SCHOOL PER YEAR, CONCURRENT WITH THE ON-THE-JOB TRAINING.

RELATED INFORMATION CONSISTS OF BLUEPRINT READING OF TRADE WORK, MATHEMATICS, TYPING, COLUMNS, PARTITIONS, CELINGS, PILASTERS, FURRING, METAL LATH, TROUGH, ORNAMENTALS, BEADS AND SCREEDS.

ORIENTATION

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PAINTERS AND DECORATORS APPRENTICES:

THE MAXIMUM AGE FOR THE APPRENTICE IS 21 YEARS, EXCEPT IN THE CASE OF VETERANS, WHOSE CASES WILL BE HANDLED ON THE MERITS OF EACH APPLICANT.

LENGTH OF THE COURSE IS THREE YEARS, WITH A MINIMUM OF 144 HOURS PER YEAR OF RELATED INSTRUCTION AND 2000 HOURS OF PRACTICAL WORK ON THE JOB.

DURING THE FIRST YEAR, THE APPRENTICE IS TAUGHT SHOP DUTIES, NAMES OF EQUIPMENT, CARE OF BRUSHES, COLORS, SOLVENTS AND THEIR USE, SANDING, PUTTYING, AND PRIMING WOOD SURFACES.

DURING THE SECOND YEAR, INSTRUCTION CONSISTS OF WALL PRIMING, WALL FINISHING AND ENAMELING WOOD SURFACES. THE THIRD YEAR WORK CONSISTS OF GLAZING, MARBLEIZING, GRAINING, PAPER HANGING, STENCILING, CUTTING AND DESIGNING

AT THE COMPLETION OF THE THREE YEARS OF INSTRUCTION AND TRAINING, THE APPRENTICE IS SUPPLIED WITH A WORKING KIT AND IS A FULL-FLIDGED JOURNEYMAN PRIVILEGED TO APPLY HIS TRAINING WHEREEVER HE DESIRES.

PLASTERERS APPRENTICES:

APPRENTICES MUST BE BETWEEN THE AGES OF 18 and 21 YEARS, EXCEPT VETERANS, WHO ARE ELIGIBLE UNTIL THEY ARE EQUIVALENT AND MUST BE REGULARLY EMPLOYED DOING PLASTERING WORK IN AN APPROVED SHOP.

SUBJECT MATTER OF THE RELATED TRAINING COURSE IS SUCH RELATED INSTRUCTION AS IS PRESCRIBED BY THE PLASTERERS JOINT APPRENTICE COMMITTEE IN ACCORDANCE WITH THE STANDARDS ESTABLISHED BY THE NATIONAL, STATE, AND LOCAL APPRENTICESHIP COMMITTEE.

THE COURSE EXTENDS OVER A PERIOD OF THREE YEARS, RUNNING CONCURRENTLY WITH EMPLOYMENT ON THE JOB, WITH FOUR HOURS A WEEK FOR A TOTAL OF 144 HOURS A YEAR THE MINIMUM REQUIREMENT.

ROOFERS APPRENTICES:

THE APPRENTICE MUST BE BETWEEN THE AGES OF 18 AND 30 YEARS. EXCEPTIONS MAY BE MADE BY THE JOINT COMMITTEE FOR THOSE BEYOND THE AGE LIMIT WHO HAVE BEEN ENGAGED IN THE TRADE, OR WHO HAVE UNUSUAL QUALIFICATIONS.

THE TERM OF THE APPRENTICE SHALL NOT BE LESS THAN THREE YEARS OF WORK ON THE JOB AND SHALL INCLUDE 144 HOURS PER YEAR OF RELATED TECHNICAL INSTRUCTION.

COURSE CONTENT INCLUDES GENERAL MATHENTICS, WATERPROOFING, TOOLS USED, SURFACE TO WHICH MATERIAL IS APPLIED, MASTIC APPLICATION, SLATE AND TILE, ROOFS, COMPOSITION, ROOFING AND SAFETY.

ORIENTATION

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SHEETMETAL APPRENTICES:

THE APPRENTICE MUST HAVE A HIGH SCHOOL EDUCATION OR ITS EQUIVLENT, MUST BE BETWEEN THE AGES OF 18 AND 21 YEARS, OR 25 YEARS IF A VETERAN, AND MUST BE REGULARLY EMPLOYED AS AN APPRENTICE IN SHEET METAL WORK IN AN APPROVED SHEET METAL ESTABLISHMENT.

THE SHEET METAL APPRENTICE SERVES A FOUR YEAR APPRENTICESHIP, AND DURING THIS PERIOD HE IS REQUIRED TO ATTEND CLASSES AT THE VOCATIONAL SCHOOL FOR A MINIMUM OF 144 HOURS PER SCHOOL YEAR.

THE APPRENTICE TRAINING COURSE, COVERING A FIELD OF RELATED ISTRUCTION AS ADOPTED BY THE NATIONAL ASSOCIATION OF SHEET METAL CONTRACTORS, STATE AND LOCAL SHEET METAL APPRENTICESHIP COMMITTEES, INCLUDES IN ITS COURSE CONTENT RELATED PATTERN DRAFTING, BASIC SHOP PROCESSES, MACHINE OPERATIONS, TRADE THEORY AND SHOP MATHEMATICS.

ORIENTATION

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SIGN PAINTERS, DESIGNERS AND PICTORIAL ARTISTS:

THE MAXIMUM, AGE FOR APPLICANTS IS 22 YEARS, EXCEPT THAT THOSE WITH UNUSUAL EXPERIENCE WILL RECEIVE SPECIAL CONSIDERATION BY THE JOINT APPRENTICESHIP COMMITTEE.

EACH APPLICANT MUST BE A HIGH SCHOOL GRADUATE, AND MUST TAKE A TEST TO DEMONSTRATE AN APTITUDE FOR ARTISTRY.

THE LENGTH OF THE APPRENTICESHIP IS FOUR YEARS, WITH A MINIMUM OF 144 HOURS PER YEAR OF RELATED CLASSROOM INSTRUCTION AND 2000 HOURS OF ON-THE-JOB PRACTICAL WORK EXPERIENCE.

UPON COMPLETION OF THE TERM OF APPRENTICESHIP AND UPON RECOMMENDATION OF THE JOINT APPRENTICESHIP COMMITTEE, THE CANDIDATE WILL BE AWARDED A COMPLETION CERTIFICATE BY THE STATE DEPARTMENT OF APPRENTICESHIP.

DADE COUNTY PUBLIC SCHOOLS
1410 NORTHEAST SECOND AVENUE
MIAMI, FLORIDA 33132

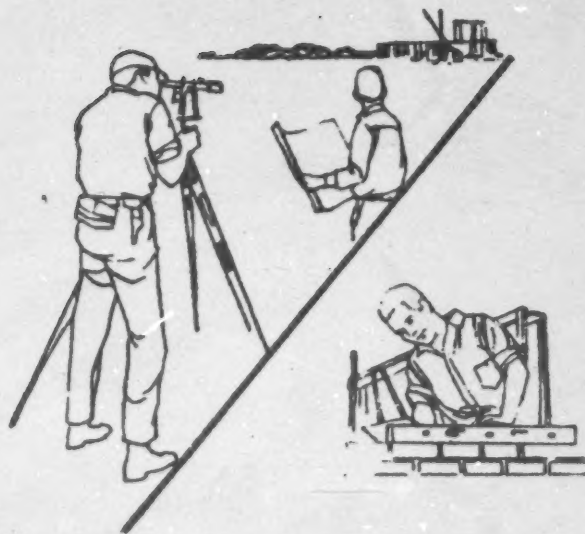
VOCATIONAL EXEMPLARY PROGRAM

INSTRUCTIONAL PACKAGE

FOR

CAREERS IN CONSTRUCTION, BUILDING
MAINTENANCE AND ALLIED OCCUPATIONS

SAFETY



THE DIVISION OF
VOCATIONAL, TECHNICAL AND ADULT EDUCATION

OBJECTIVES

THE STUDENT WILL DEMONSTRATE HIS KNOWLEDGE AND ABILITY IN THE FOLLOWING AREAS.

1. SHOP SAFETY RULES. THE STUDENT WILL:

- A. PASS A PREPARED TEST OF 15 QUESTIONS WITH THE MINIMUM SCORE OF 80% CORRECT.
- B. SHOW DAILY USE OF SHOP SAFETY RULES. (STUDENT EVALUATION FORM, INSTRUCTOR JUDGEMENT).

2. POWER TOOL SAFETY. THE STUDENT WILL:

- A. PASS A PREPARED TEST OF 30 QUESTIONS WITH THE MINIMUM SCORE OF 80% CORRECT.
- B. SHOW DAILY USE OF POWER TOOLS SAFETY. (STUDENT EVALUATION FORM, INSTRUCTOR JUDGEMENT).

3. HAND TOOL SAFETY. THE STUDENT WILL:

- A. PASS A PREPARED TEST OF 25 QUESTIONS WITH THE MINIMUM SCORE OF 80% CORRECT.
- B. SHOW DAILY USE OF HAND TOOLS SAFETY. (STUDENT EVALUATION FORM, INSTRUCTOR JUDGEMENT).

4. FIRE AND ELECTRICAL SAFETY. THE STUDENT WILL:

- A. PASS A PREPARED TEST OF 25 QUESTIONS WITH A MINIMUM SCORE OF 80% CORRECT.
- B. BE ABLE TO SHOW PROPER USE OF ALL FIRE AND ELECTRICAL SAFETY PROCEDURES AT THE INSTRUCTORS REQUEST.

SHOP RULES

STUDENTS WILL:

1. CLEAN SHOP AFTER EACH CLASS
2. TAKE CARE OF CREW'S TOOLS.
3. PICK UP ALL SCRAP MATERIAL AND PUT IN PROPER PLACE.
4. RETURN PROJECT TO STORAGE SPACE.
5. PICK UP ALL UN-USED NAILS AND RETURN TO NAIL BINS.
6. CLEAN ALL POWER EQUIPMENT AFTER EACH CLASS.
7. CHECK ALL POWER TO MAKE SURE IT IS OFF.
8. NOT DISTURB OTHER STUDENTS PROJECTS, TOOLS, OR MATERIALS
9. CLEAN UP OUTSIDE AREA.
10. RETURN DESKS TO STORAGE RACKS.
11. NOT LEAVE NAILS IN UN-USED MATERIALS.
12. BE PREPARED TO START WORK WHEN CLASS TIME STARTS.
13. NOT LEAVE SHOP WITHOUT PERMISSION.
14. DISPLAY COURTESY TO FELLOW STUDENTS.

SAFETY RULES: STUDENTS MUST KNOW AND ABIDE BY SAFETY RULES

EACH STUDENT MUST LEARN AND EVERY SAFETY RULE BEFORE HE WILL BE ALLOWED TO WORK IN THE CONSTRUCTION SHOP: HE WILL BE TESTED ON THE RULES AND MUST PASS WITH A MINIMUM SCORE OF 80%.

1. PERMISSION TO USE ANY POWER EQUIPMENT MUST BE OBTAINED FROM THE INSTRUCTOR BEFORE USING IT EACH TIME.
2. TAKE AND PASS SAFETY TEST BEFORE USING POWER TOOLS.
3. HORSEPLAY IS NOT TO BE INDULGED IN AT ANY TIME. DO NOT RUN OR MAKE LOUD NOISES IN THE SHOP.
4. AVOID STANDING IN LINE AT POWER TOOL WHILE IT IS IN OPERATION.
5. DO NOT TALK TO OTHERS WHILE USING A MACHINE AND DO NOT TALK TO ANYONE WHO IS USING A MACHINE.
6. LOOSE CLOTHING AND LONG SLEEVES ARE TO BE SECURED, ALSO, RINGS AND NECKTIES ARE TO BE REMOVED.
7. GUARDS PROVIDED ON EQUIPMENT MUST BE IN USE AT ALL TIMES.
8. GOGGLES ARE TO BE WORN WHENEVER EYE HAZARDS ARE PRESENT.
9. KEEP ATTENTION ON WORK.
10. KNOW THE LOCATION OF FIRE FIGHTING EQUIPMENT AND HOW TO USE IT. (FIRE EQUIPMENT IS USUALLY PAINTED BRIGHT RED).
11. INSTRUCTOR SHOULD BE ASKED TO CHECK YOUR SET-UP BEFORE POWER TOOLS ARE TURNED ON.
12. INSTRUCTOR MUST BE IN THE SHOP WHEN POWER TOOLS ARE BEING USED.
13. CLEAN MACHINES WITH A BRUSH AFTER USING. DO NOT USE HANDS OR COMPRESSED AIR.
14. ELECTRICAL PROJECTS MUST BE CHECKED BY INSTRUCTOR BEFORE POWER IS APPLIED.
15. KNOW THE LOCATION OF ALL ELECTRICAL PANIC BUTTONS.
16. ALL POWER TOOLS WILL BE TURNED OFF WHEN NOT IN USE.
17. POWER TOOLS WILL BE UNPLUGGED WHEN CLEANING, OILING, OR CHANGING BLADES OR BITS.
18. HAIR LENGTH MUST CONFORM TO SAFETY STANDARDS AND MUST NOT CAUSE SAFETY PROBLEMS FOR STUDENT OR CO-WORKERS.
19. STUDENTS WILL KEEP A HANDBOOK ON ALL SAFETY PROCEDURES.

POWER TOOLS

BEST COPY AVAILABLE



National Safety Council



National Safety Council

1. BE SURE THAT ALL POWER TOOLS ARE GROUNDED. POWER TOOLS MUST HAVE A 3-WIRE CONDUCTOR CORD. A 3-PRONG PLUG CONNECTS INTO A GROUNDED OUTLET (RECEPTACLE). CONSULT LOCAL CODES FOR PROPER GROUNDING SPECIFICATIONS.
2. POWER TOOLS SHOULD BE INSPECTED AND SERVICED AT REGULAR INTERVALS BY A QUALIFIED REPAIRMAN.
3. KNOW AND UNDERSTAND ALL OF THE MANUFACTURER'S SAFETY RECOMMENDATIONS.
4. BE FAMILIAR WITH THE OPERATING PRINCIPLES OF THE TOOL. IF YOU HAVE ANY QUESTIONS ON SAFETY OR OPERATION, CHECK WITH YOUR SUPERVISOR.
5. INSPECT ELECTRICAL CORDS TO SEE THAT THEY ARE IN GOOD CONDITION.
6. DO NOT LEAVE ELECTRICAL CORDS WHERE THEY MAY BE RUN OVER OR DAMAGED. DO NOT ALLOW THEM TO KINK. KEEP CORDS OUT OF WATER.
7. BE SURE THAT ALL SAFETY GUARDS ARE PROPERLY IN PLACE AND IN WORKING ORDER.
8. REMOVE TIE, RINGS, WRISTWATCH, AND ROLL UP SLEEVES BEFORE USING POWER TOOLS.
9. BE SURE THAT YOUR HANDS ARE DRY. IF YOU MUST WORK IN A WET AREA, WEAR RUBBER GLOVES AND RUBBER-SOLED SHOES.
10. MAKE ALL ADJUSTMENTS AND INSPECTIONS WITH THE POWER OFF AND THE CABLE DISCONNECTED.

ELECTRICAL OUTLETS



APPROVED ELECTRICAL OUTLETS (RECEPTACLES) COMMONLY USED FOR 110 VOLT TOOLS AND EQUIPMENT. (AMPERAGE AND VOLTAGE IS GIVEN ON A METAL PLATE ATTACHED TO THE MOTOR OF THE TOOL).



APPROVED ELECTRICAL OUTLETS, (RECEPTACLES) COMMONLY USED FOR 220 VOLT TOOLS AND EQUIPMENT. (AMPERAGE AND VOLTAGE IS GIVEN ON A METAL PLATE ATTACHED TO THE MOTOR OF THE TOOL).

SHOP SAFETY TEST

CIRCLE THE CORRECT ANSWER

1. ELECTRICAL PROJECTS MUST:
 - A. BE THREE WIRES
 - B. CHECKED BY INSTRUCTOR BEFORE POWER IS TURNED ON
 - C. BE TWO WIRES
2. TO CLEAN POWER TOOLS YOU USE:
 - A. COMPRESSED AIR
 - B. HANDS AND CLOTH
 - C. BRUSHES
3. BEFORE USING A POWER TOOL YOU FIRST MUST:
 - A. KNOW IF THE BLADE IS SHARP
 - B. PUT ON GOGGLES
 - C. ASK INSTRUCTOR
4. THE LAST THING YOU DO WHEN FINISHED WITH A POWER TOOL IS:
 - A. CHANGE THE BLADE
 - B. UNPLUG IT
 - C. CLEAN IT
5. FIRE EQUIPMENT IS USUALLY PAINTED:
 - A. BLUE
 - B. YELLOW
 - C. RED
6. LOOSE SLEEVES:
 - A. ARE ALRIGHT FOR SHOP WEAR
 - B. MAY GET CAUGHT IN THE MACHINERY
 - C. NEVER IS A DANGER
7. WHEN SOMEONE ELSE IS USING A POWER TOOL YOU SHOULD:
 - A. TELL THE INSTRUCTOR
 - B. WAIT IN LINE QUIETLY
 - C. FIND SOMETHING ELSE TO DO UNTIL TOOL IS FREE
8. THE FIRST STEP IN CASE OF FIRE IS TO:
 - A. RUN FOR NEAREST EXIT
 - B. LOOK FOR EXTINGUISHERS
 - C. THROW WATER ON THE FLAMES
9. IF A STUDENT IS BEING SHOCKED YOU SHOULD FIRST:
 - A. PULL TOOL AWAY FROM HIM
 - B. CALL INSTRUCTOR
 - C. PANIC BUTTON
10. STUDENTS ARE PERMITTED HORSEPLAY:
 - A. JUST AFTER ROLL
 - B. AFTER CLEAN UP
 - C. NEVER

NAME: _____

DATE: _____

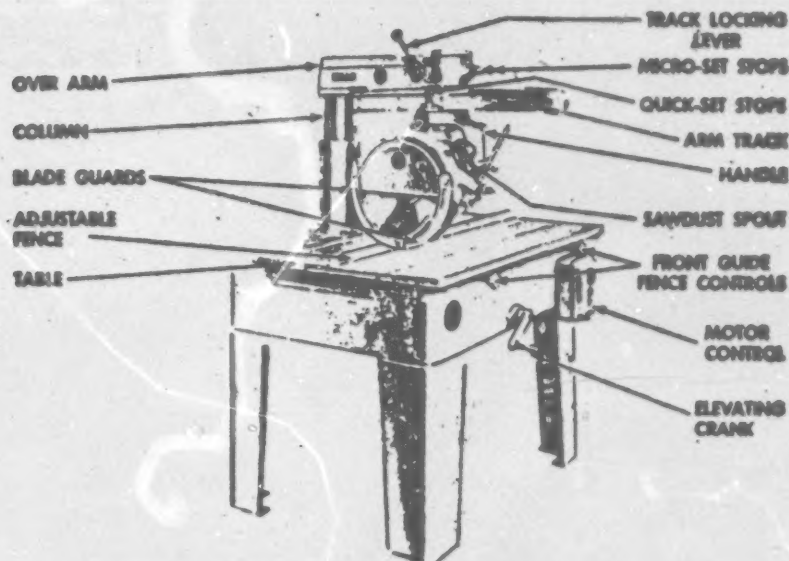
SAFETY

Pg. 7

SHOP SAFETY TEST (CONT'D)

CIRCLE THE CORRECT ANSWER

11. GOGGLES SHOULD BE WORN:
- A. WHEN ENTERING SHOP
 - B. WHEN AROUND POWER TOOLS
 - C. WHEN USING HAND SAW
12. TALKING TO OTHERS IS ALLOWED ONLY:
- A. WHEN WAITING TO USE A POWER TOOL
 - B. DURING ROLL CALL
 - C. WHEN WORKING ON PROJECT AND NOT USING POWER TOOLS
13. YOU UNPLUG POWER TOOLS WHEN:
- A. MAKING ADJUSTMENTS
 - B. CHANGING BLADES OR BITS
 - C. YOU ARE THROUGH WITH TOOL
14. A 220 VOLT PLUG LOOKS LIKE:
- A.
 - B.
 - C.



SAFETY: RADIAL SAW

1. BE SURE THAT THE SAW IS PROPERLY GROUNDED.
2. REMOVE TIE, RINGS, WRISTWATCH, AND ROLL UP SLEEVES.
3. WITH POWER OFF AND CABLE DISCONNECTED, MAKE SURE THAT ALL SAFETY DEVICES ARE FUNCTIONING PROPERLY. CHECK BLADE TO SEE THAT IT IS THE RIGHT TYPE FOR THE WORK TO BE DONE, IS IN GOOD CONDITION, AND IS TIGHT ON THE ARBOR.
4. MAKE ALL ADJUSTMENTS BEFORE CONNECTING TO POWER SUPPLY.
5. MAKE SURE THAT WORK TO BE CUT IS FREE OF NAILS AND OBSTRUCTIONS. BE SURE THAT THE WORK AREA IS CLEARED OF LOOSE MATERIAL OR SCRAPS THAT MIGHT CAUSE TRIPPING OR FALLING. BE SURE THAT THE SAW BLADE IS CLEAR AND THE TABLE IS CLEAR OF SCRAPS.
6. THE TABLE IS CLEANED WITH A BRUSH WHEN THE SAW IS NOT RUNNING. POWER MUST BE TURNED OFF.
7. MAKE CERTAIN THAT THE MATERIAL TO BE CUT IS SOLIDLY AGAINST THE FENCE.
8. BE SURE THE BLADE GUARD IS ADJUSTED TO THE THICKNESS OF THE MATERIAL TO BE CUT.
9. CUT ONLY ONE PIECE AT A TIME.
10. KEEP YOUR FULL ATTENTION FOCUSED ON THE WORK.
11. WEAR GOGGLES IF NECESSARY.
12. TURN ON POWER AND ALLOW BLADE TO COME TO FULL SPEED BEFORE STARTING TO CUT.
13. ALWAYS PULL THE BLADE, RATHER THAN PUSHING IT THROUGH THE MATERIAL TO BE CUT. HAVE A FIRM GRIP ON THE HANDLE.
14. DO NOT FORCE THE SAW. CROWDING THE SAW IS DANGEROUS AND MAY RESULT IN BREAKING THE SAW.
15. KEEP HANDS AWAY FROM THE DIRECTION OF TRAVEL OF THE SAW.
16. WHEN THROUGH, SHUT OFF POWER, AND DISCONNECT FROM POWER SOURCE. DO NOT LEAVE UNTIL BLADE HAS COME TO A COMPLETE STOP.

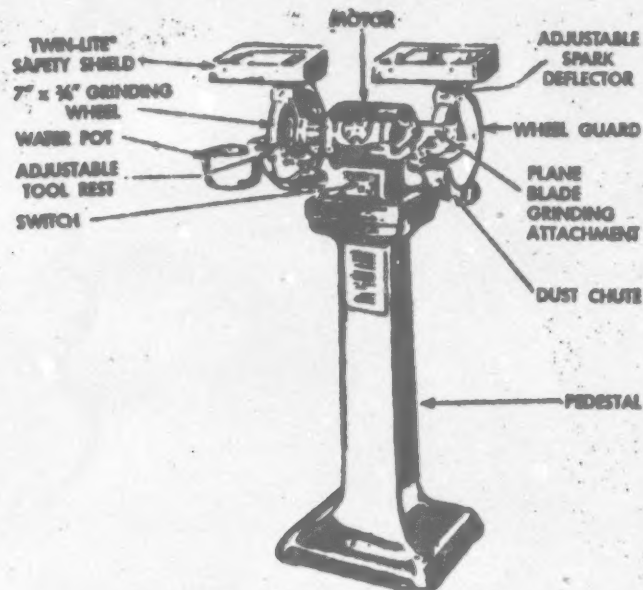
TEST - RADIAL ARM SAW

TRUE OR FALSE: MARK "T" IF THE ANSWER IS TRUE, "F" IF FALSE.

1. _____ GOGGLES DO NOT HAVE TO BE WORN WHEN USING RADIAL SAW.
2. _____ ALWAYS PULL BLADE TOWARDS YOU WHEN CUTTING.
3. _____ BLADE MUST BE RUNNING AT FULL SPEED BEFORE CUTTING.
4. _____ GUARD MUST BE ADJUSTED TO THICKNESS OF MATERIAL.
5. _____ MAKE ALL ADJUSTMENTS BEFORE STARTING SAW.
6. _____ YOU MUST REMOVE ONLY NAILS THAT ARE IN THE WAY OF CUTTING BLADE.
7. _____ YOU MAY CUT THREE 2" x 4" 'S AT ONE TIME ON A RADIAL ARM SAW.
8. _____ BLADE MUST BE SHARP BEFORE CUTTING.
9. _____ SAW SHOULD BE GROUNDED.
10. _____ OUR RADIAL SAW RUNS ON 110 VOLT ELECTRICITY.
11. _____ IF THE SAW BLADE JAMS OR STALLS, THE OPERATOR SHOULD TRY TO FORCE THE SAW.
12. _____ MATERIAL TO BE CUT SHOULD BE HELD SOLIDLY AGAINST THE ADJUSTABLE FENCE.

NAME: _____ DATE: _____

DOUBLE-PURPOSE BENCH GRINDER AND PARTS



SAFETY: GRINDERS

1. BE SURE THAT THE GRINDER IS PROPERLY GROUNDED.
2. REMOVE TIE, RINGS, WRISTWATCH, AND ROLL UP SLEEVES.
3. CHECK TO SEE THAT THE GRINDING WHEEL IS IN GOOD CONDITION, OF THE PROPER TYPE FOR THE WORK TO BE DONE, AND IS PROPERLY AND SECURELY INSTALLED.
4. BEFORE CONNECTING TO THE POWER SOURCE, BE SURE THAT THE SWITCH IS IN THE OFF POSITION.
5. ALWAYS WEAR GOGGLES. (SOME GRINDERS HAVE SAFETY SHIELDS WHICH PREVENT MOST BUT NOT ALL OF THE SHARP PIECES OF STEEL AND GRIT FROM GETTING INTO YOUR EYES. ONLY GOGGLES GIVE COMPLETE PROTECTION).
6. WEAR A DUST MASK IF NECESSARY.
7. WEAR CLOSE-FITTING GARMENTS. LOOSE OR RAGGED CLOTHING IS HAZARDOUS. DO NOT WEAR GLOVES.
8. CHECK TO SEE THAT THE FLOOR AROUND THE GRINDER IS CLEARED OF LOOSE MATERIAL OR OIL SPOTS.
9. USE A GRINDER ONLY WHEN WHEEL GUARDS ARE IN PLACE. WHEEL GUARDS PROTECT YOU IF A WHEEL BREAKS WHEN GRINDING. WHEEL GUARDS ALSO PROTECT OTHERS WHO MIGHT ACCIDENTALLY BUMP INTO THE GRINDER WHILE IT IS RUNNING. IT IS NOT SAFE TO USE THE GRINDER WHEN THE WHEEL GUARDS ARE REMOVED.

SAFETY: GRINDERS (CONT'D)

10. SET WORK REST AT OR ABOVE CENTER AND 1/16" AWAY FROM WHEEL. ACCIDENTS HAVE HAPPENED BECAUSE OF TOO MUCH SPACE BETWEEN THE REST AND THE WHEEL, FOR TOOLS MAY BECOME WEDGED IN THIS SPACE, CAUSING THE GRINDING WHEEL TO BREAK AND FLY APART. THE FLYING PIECES COULD EASILY CAUSE A SERIOUS INJURY. AFTER DRESSING THE WHEEL STOP THE GRINDER, AND SET THE WORK REST ABOVE CENTER AND 1/16" AWAY FROM THE WHEEL. TIGHTEN THE WORK REST SO THAT IT WILL NOT MOVE WHEN YOU ARE USING IT.
11. STAND TO ONE SIDE WHEN TURNING ON GRINDER. DURING THE STARTING PERIOD, THE MOTOR INCREASES IN SPEED SO RAPIDLY THAT A GREAT STRAIN IS PLACED UPON THE WHEEL. IF THE EMERY WHEEL HAS DEFECTS, IT MAY FLY APART DURING THE STARTING PERIOD, SO IT IS GOOD PRACTICE TO STAND TO ONE SIDE WHEN STARTING THE GRINDER.
12. NEVER TOUCH A GRINDING WHEEL WITH YOUR HANDS. WHEN THE GRINDER IS TURNED OFF, THE WEIGHT OF THE WHEELS MIGHT KEEP IT RUNNING FOR A LONG TIME. BECAUSE IT LOOKS AS THOUGH IT STOPPED, YOU MIGHT CARELESSLY TOUCH THE WHEEL WITH YOUR HAND. THIS COULD CAUSE A PAINFUL AND PROBABLY A SERIOUS INJURY.
13. HOLD THE WORK FIRMLY ON THE TOOL REST.
14. DO NOT HOLD TOOL WITH A CLOTH, AND DO NOT WEAR GLOVES. KEEP THE TOOL COOL BY DIPPING IT IN WATER: THEN YOU WILL NOT HAVE TO PROTECT YOUR HANDS FROM THE HOT METAL. THE USE OF GLOVES OR A CLOTH IS NOT SAFE BECAUSE THE FABRIC MIGHT BE CAUGHT AND PULL THE HAND INTO THE REVOLVING WHEEL.
15. GRIND ON FACE OF WHEEL. MOST GRINDING WHEELS WERE MADE FOR FACE GRINDING ONLY. GRINDING ON THE SIDE OF THE WHEEL MAY WEAR A GROOVE, WEAKEN THE WHEEL, AND FINALLY CAUSE IT TO BREAK.
16. SMALL PIECES SHOULD NOT BE GROUND ON THE EMERY WHEEL WITHOUT A PROPER HOLDER.
17. DO NOT GRIND THIN STOCK; THIS IS A DANGEROUS PRACTICE. THE THIN EDGE MAY TURN DOWN AND DRAG THE OPERATOR'S HAND INTO THE MACHINE.
18. KEEP FINGERS CLEAR OF THE ABRASIVE WHEEL.
19. STOP GRINDER TO MAKE ADJUSTMENTS. NEVER PUT WORK ON THE TABLE OR REMOVE IT WITHOUT STOPPING THE WHEEL.
20. NEVER REMOVE GUARD WHEN GRINDING.
21. GRINDING WORK FOR A LONG TIME THE SAME SPOT ON YOUR WHEEL WILL WEAR A GROOVE IN THE WHEEL.
22. AVOID GRINDING ROUND CORNERS ON GRINDING WHEEL.
23. TWO PEOPLE SHOULD NEVER USE THE MACHINE AT THE SAME TIME.
24. KEEP HANDS AWAY FROM YOUR EYES. IT IS EASY TO RUB FINE PARTICLES FROM HANDS TO FACE INTO THEM. WASH YOUR HANDS THOROUGHLY AFTER USING GRINDER.
25. NEVER LEAVE ANY PARTICLE FROM AN EMERY WHEEL IN YOUR EYE OVERNIGHT OR WIPE ANYTHING OUT OF YOUR EYE WITH COTTON WASTE, MATCH PENCIL, OR TOOTHPICK. SEE A DOCTOR IF EYE CAUSES TROUBLE.
26. GET PROMPT FIRST AID IF YOU ARE INJURED ON THE STONE (GRINDER WHEEL).
27. KEEP YOUR FULL ATTENTION FOCUSED ON THE WORK. HORSEPLAY SHOULD NEVER BE ENGAGED IN AROUND GRINDING WHEELS.
28. WHEN WORK IS COMPLETED, TURN OFF POWER, AND DISCONNECT FROM POWER SOURCE. NEVER LEAVE THE GRINDER UNATTENDED WHILE THE WHEEL IS STILL TURNING. 92

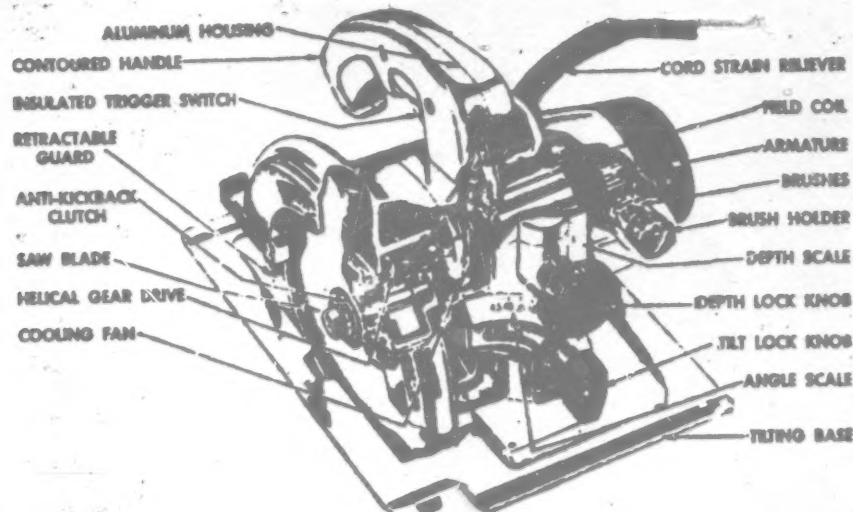
TEST - BENCH GRINDER

TRUE OR FALSE: MARK "T" IF THE ANSWER IS TRUE, "F" IF FALSE.

1. _____ WHEN A SHIELD IS PROVIDED, GOGGLES NEED NOT BE WORN.
2. _____ STANDING TO ONE SIDE IS THE BEST WAY TO USE GRINDER.
3. _____ FOR SHARPENING TOOLS, YOU USE THE SIDE OF THE WHEEL.
4. _____ DO NOT GRIND THIN STOCK.
5. _____ WITH TWO WHEELS ON A GRINDER, IT IS SAFE FOR TWO PERSONS TO USE THE GRINDER AT THE SAME TIME.
6. _____ GLOVES ARE GOOD TO KEEP SPARKS FROM BURNING YOUR HANDS.
7. _____ WORK REST SHOULD BE 1/16" AWAY FROM WHEEL.
8. _____ YOU MAY USE A CLOTH TO HOLD MATERIALS WHEN THEY ARE TOO HOT TO HOLD IN HANDS.
9. _____ EMERY WHEELS NEVER FLY APART.
10. _____ MINOR ADJUSTMENTS MAY BE MADE WITHOUT STOPPING GRINDER.

NAME: _____ DATE: _____

PORTABLE POWER SAW PARTS



SAFETY: PORTABLE POWER SAW

1. BE SURE THAT THE SAW IS PROPERLY GROUNDED.
2. REMOVE TIE, RINGS, WRISTWATCH AND ROLL UP SLEEVES.
3. WITH SAW OFF AND DISCONNECTED FROM POWER SOURCE, MAKE SURE THAT THE BLADE IS IN GOOD SHAPE AND IS THE PROPER TYPE FOR THE WORK TO BE DONE. CHECK TO SEE THAT THE BLADE IS TIGHT.
4. CHECK TO SEE THAT THE RETRACTABLE BLADE GUARD IS FUNCTIONING PROPERLY BEFORE CONNECTING SAW TO POWER SOURCE. NEVER TIE BACK THE BLADE GUARD.
5. MAKE ALL ADJUSTMENTS WITH POWER OFF AND WITH SAW DISCONNECTED FROM POWER SUPPLY.
6. ALWAYS MAKE CERTAIN SWITCH IS IN OFF POSITION BEFORE CONNECTING INTO POWER SOURCE. KEEP ELECTRICAL CORD CLEAR OF OPERATION.
7. MAKE SURE THAT THE MATERIAL TO BE CUT IS FIRMLY SUPPORTED AND FREE OF OBSTRUCTION.
8. BRING THE SAW BLADE UP TO THE DESIRED POINT OF CUT, BACK UP SLIGHTLY, AND START THE MOTOR. WHEN FULL SPEED IS REACHED, ADVANCE THE SAW THROUGH THE WORK. DO NOT FORCE THE SAW.
9. NEVER REACH UNDERNEATH THE MATERIAL BEING CUT.
10. STAND TO ONE SIDE OF THE CUT.
11. WHEN THROUGH THE CUT, RELEASE THE SWITCH. APPLY BRAKE OR WAIT UNTIL BLADE STOPS BEFORE SETTING SAW DOWN.
12. DISCONNECT SAW FROM POWER.
13. TO REMOVE SAW BLADE STAND IN OPERATING POSITION AND TURN THE ARBOR NUT TOWARDS YOU.

TEST - PORTABLE SAW

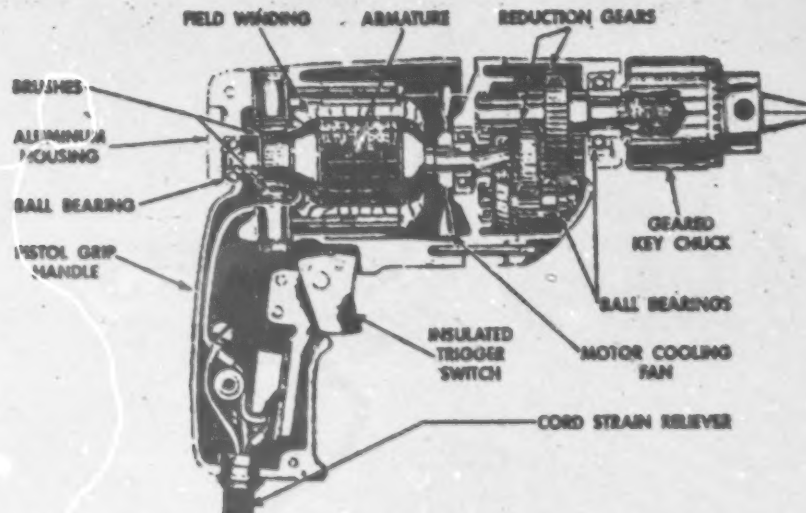
TRUE OR FALSE: MARK "T" IF THE ANSWER IS TRUE, "F" IF FALSE.

1. _____ THE FIRST STEP IN USING A POWER SAW IS TO MAKE SURE THE BLADE IS TIGHT.
2. _____ IT IS BEST TO WEAR LONG SLEEVES WHILE USING THE POWER SAW TO KEEP SAW DUST OFF YOUR ARMS.
3. _____ TO REMOVE BLADES, STAND IN OPERATING POSITION AND TURN ARBOR NUT TOWARDS YOU.
4. _____ IT IS NOT NECESSARY TO UNPLUG SAW TO CHANGE BLADE, AS LONG AS THE SWITCH IS OFF.
5. _____ DO NOT FORCE SAW.
6. _____ THE RETRACTABLE GUARD IS JUST TO KEEP SAW DUST FROM FLYING IN YOUR FACE.
7. _____ ONE SHOULD REMOVE RINGS AND NECKTIES BEFORE USING SAW.
8. _____ STAND TO ONE SIDE WHILE CUTTING.
9. _____ PORTABLE SAW WILL NOT CUT AT AN ANGLE.
10. _____ NEVER CUT WORK WITH A DULL BLADE.

NAME: _____

DATE: _____

PORTABLE ELECTRIC DRILL AND PARTS



SAFETY: PORTABLE POWER DRILLS

1. BE SURE THAT THE DRILL IS PROPERLY GROUNDED.
2. REMOVE TIE, RINGS, WRISTWATCH AND ROLL UP SLEEVES.
3. BE SURE THAT THE MATERIAL TO BE DRILLED IS SECURELY CLAMPED.
4. DRILL SHOULD BE TURNED OFF AND DISCONNECTED FROM POWER SOURCE WHILE REMOVING OR INSTALLING DRILL BIT.
5. BEFORE CONNECTING TO POWER SOURCE, MAKE CERTAIN SWITCH IS IN OFF POSITION.
6. USE THE PROPER DRILL FOR THE JOB. BE SURE THAT THE DRILL IS NOT FAULTY OR DULL.
7. BEFORE STARTING DRILL, MAKE CERTAIN DRILL BIT IS SECURELY GRIPPED IN THE CHUCK.
8. CHECK TO SEE THAT KEY HAS BEEN REMOVED FROM CHUCK BEFORE STARTING DRILL.
9. LOCATE THE EXACT POINT WHERE THE HOLE IS DESIRED AND INDENT WITH CENTER PUNCH OR AWL.
10. KEEP YOUR FULL ATTENTION FOCUSED ON THE WORK.
11. DRILL WITH EVEN, STEADY PRESSURE, AND LET THE DRILL DO THE WORK.
12. WHEN WORK IS COMPLETED, DISCONNECT DRILL FROM POWER SOURCE AND REMOVE DRILL BIT.

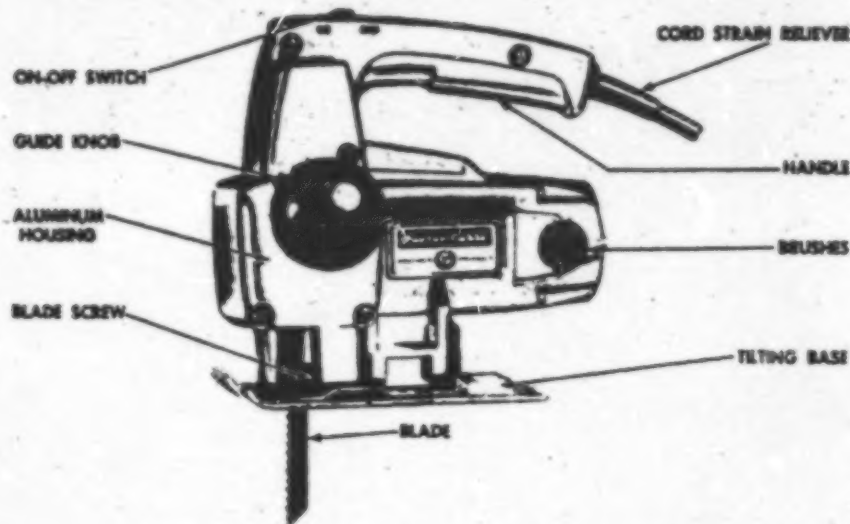
TEST - PORTABLE DRILL

TRUE OR FALSE: MARK "T" IF THE ANSWER IS TRUE, "F" IF FALSE.

1. _____ DRILL DOES NOT HAVE TO BE GROUNDED.
2. _____ CHUCK KEY IS TO HOLD BIT IN WHILE DRILLING.
3. _____ BIT MAY BE TIGHTENED BY HAND.
4. _____ YOU MUST UNPLUG DRILL BEFORE REMOVING BITS.
5. _____ PORTABLE DRILLS RUN ON 220 V.

NAME: _____ DATE: _____

HEAVY DUTY SABRE SAW AND PARTS



SAFETY: SABRE SAWS AND RECIPROCATING SAWS

1. BE SURE THAT THE SAW IS PROPERLY GROUNDED.
2. REMOVE TIE, RINGS, WRISTWATCH, AND ROLL UP SLEEVES.
3. USE THE PROPER SAW BLADE FOR THE WORK TO BE DONE; BE SURE THE BLADE IS SECURELY LOCKED IN PLACE.
4. CLAMP THE MATERIAL TO BE CUT, USING BENCH VISE OR CLAMPS.
5. BE SURE THAT THE MATERIAL TO BE CUT IS FREE OF OBSTRUCTIONS.
6. KEEP YOUR FULL ATTENTION FOCUSED ON THE WORK.
7. ALWAYS MAKE SURE THAT SWITCH IS IN OFF POSITION BEFORE CONNECTING TO POWER SOURCE.
8. GRIP HANDLE FIRMLY WITH RIGHT HAND AND CONTROL FORWARD AND TURNING MOVEMENTS WITH LEFT HAND ON FRONT GUIDE. (IN SOME TYPES OF RECIPROCATING SAWS, THE SAW IS GUIDED BY GRASPING THE HOUSING BOOT).
9. SABRE SAW. TO START CUT, PLACE FORWARD EDGE OR SAW BASE ON EDGE OF MATERIAL, START MOTOR, AND MOVE BLADE INTO WORK.
RECIPROCATING SAW. TO START CUT, PLACE SAW BLADE NEAR MATERIAL TO BE CUT, START MOTOR, AND MOVE BLADE INTO WORK.
10. KEEP CUTTING PRESSURE CONSTANT. DO NOT OVERLOAD THE SAW.
11. NEVER REACH UNDERNEATH THE MATERIAL BEING CUT.
12. WHEN THROUGH CUTTING, TURN OFF SWITCH. DO NOT PUT SAW DOWN UNTIL MOTOR STOPS.
13. WHEN WORK IS COMPLETED, DISCONNECT SAW FROM POWER SOURCE AND REMOVE SAW BLADE.

TEST - SABRE SAW

TRUE OR FALSE: MARK "T" IF THE ANSWER IS TRUE, "F" IF FALSE.

1. _____ A SABRE SAW MUST BE GROUNDED.
2. _____ DO NOT PUT SAW DOWN UNTIL MOTOR STOPS.
3. _____ YOU DO NOT HAVE TO DISCONNECT SABRE SAW PLUG TO CHANGE BLADES.
4. _____ TO START SAW HOLD SWITCH ON AND PLUG CORD INTO OUTLET.
5. _____ WHEN CUTTING HARD WOODS, YOU MUST PUSH HARDER ON SAW IN ORDER TO CUT WOOD.

NAME: _____ DATE: _____

BLOCK-UNIT PLAN FOR TEACHER

INSTRUCTOR WILL:

A. INSTRUCT STUDENT IN THE USE OF TOOLS BY HAVING STUDENT:

1. HAMMER

- a. DRIVE AT LEAST TWO 8D NAILS INTO THE 2 x 4, USING PROPER DRIVING PROCEDURES, AS SHOWN ON HANDOUT #1.
- b. PULL THE DRIVEN NAILS, USING PROPER PROCEDURES AS SHOWN ON HANDOUT #1.

2. SAW

- a. USE RULE TO DRAW A STRAIGHT LINE ON THE 2 x 4 ABOUT 2" FROM THE END (IT IS NECESSARY THAT THE LINE BE SQUARE, JUST STRAIGHT).
- b. USING STEPS AS SHOWN ON HANDOUT #3 AND 4, CUT OFF THE BOARD.
- c. REPEAT PROCEDURE UNTIL HE CUTS WITH AN ACCEPTABLE DEGREE OF PROFICIENCY.

3. PLANE

- a. DRAW A LINE LENGTH-WISE ON THE REMAINDER OF THE 2 x 4, ABOUT 1/8" FROM THE EDGE.
- b. USE THE PROCEDURES SHOWN ON HANDOUT #'S 5, 6 AND 7 TO PLANE TO THE LINE.

4. BRACE AND BIT

- a. PLACE BIT INTO BRACE AND TIGHTEN, USING DIRECTIONS.
- b. DRILL AT LEAST 4 HOLES IN THE 2 x 4.

REASONS FOR OBJECTIVES:

TO ACQUAINT THE STUDENT WITH THE PROPER USE AND SAFETY OF HAND TOOLS.

EVALUATION:

STUDENT WILL BE EVALUATED BY INSTRUCTOR WHILE PERFORMING TASKS IN THIS PACKAGE.

NO WRITTEN TEST WILL BE GIVEN.

CAREERS IN CONSTRUCTION,
BUILDING MAINTENANCE AND
ALLIED OCCUPATIONS
BLOCK II UNIT A

Vocational Exemplary Program
Dade County Public Schools

HAND TOOLS

Pg. 2

STUDENT'S NAME _____
(LAST) (FIRST)

CLASS/SECTION _____ STARTED: TIME: _____ DATE _____

TARGET COMPLETION TIME: _____

COMPLETED TIME: _____ DATE _____

PRE-TEST: NONE

STUDENT OBJECTIVES:

THE STUDENT WILL BE ABLE TO:

1. DRIVE AN 8D NAIL USING PROPER DRIVING PROCEDURES.
2. PULL AN 8D NAIL USING PROPER PULLING PROCEDURES.
3. CUT A BOARD ALONG A STRAIGHT LINE.
4. PLAN A BOARD USING PROPER PROCEDURES.
5. CHOOSE PROPER BIT SIZE AND DRILL A HOLE WITH A BRACE AND A BIT.

REASONS FOR OBJECTIVES:

TO ACQUAINT THE STUDENT WITH THE PROPER USE OF SAFETY IN HANDLING THEM.

LEARNING ACTIVITIES:

PRACTICE IN PROPER HANDLING OF THE HAMMER, HAND SAW AND BRACE/BIT.

EVALUATION:

THE STUDENT WILL BE EVALUATED ON HIS MANIPULATIVE SKILLS BY THE INSTRUCTOR.

THERE WILL BE NO WRITTEN TEST GIVEN.

MATERIAL LIST

MATERIAL	SIZE	TYPE	QUANTITY
2 x 4	4'-0"		1
NAILS	16D	DUPLEX	3

TOOL LIST

MATERIAL	SIZE	TYPE	QUANTITY
HAMMER		16 oz.	1
RULE	6 FT.	FOLDING	1
PENCIL			1
SAW		CROSSCUT	1
PLANE		JACK	1
BRACE			1
BIT	1/2"	AUGER	1
	102		

HAND TOOLS

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SAFETY

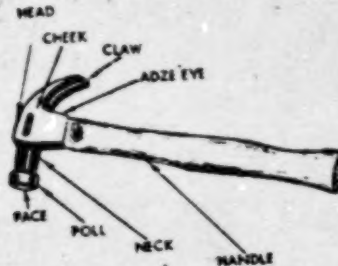
1. ALWAYS FOCUS YOUR FULL ATTENTION ON THE WORK.
2. USE THE RIGHT TOOL FOR THE JOB.
3. LEARN HOW TO USE THE TOOL PROPERLY.
4. KEEP EACH TOOL IN ITS BEST CONDITION.
5. KEEP EACH TOOL IN ITS PLACE.
6. WHEN USING SHARP-EDGED TOOLS, CUT AWAY FROM THE BODY.
7. KEEP SHARP-EDGED TOOLS AWAY FROM THE EDGE OF A BENCH OR WORK AREA.
8. CARRY SHARPLY POINTED AND SHARP-EDGED TOOLS WITH THE CUTTING EDGE POINTING DOWN.
9. KEEP TOOLS SHARP AND CLEAN.
10. ALWAYS USE A FILE WITH A HANDLE.
11. DO NOT STRIKE HARDENED METALS OR TOOLS WITH A HARD-FACED HAMMER.
12. BATTER-HEADS OR METAL TOOLS MUST BE KEPT GROUND SMOOTH AND SQUARE TO AVOID MUSHROOMING.

HAND TOOLS

Pg. 5

SAFETY RULES

(HAMMER)

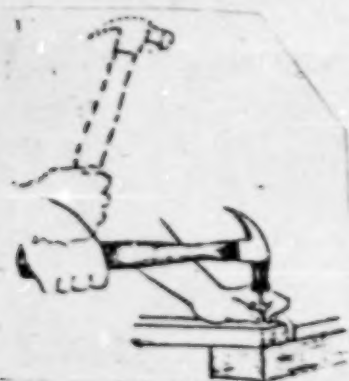


1. KEEP YOUR ATTENTION FOCUSED ON THE WORK
2. BE SURE THAT THE HANDLE OF THE HAMMER IS SOUND AND WITHOUT SPLINTERS.
3. USE THE HAMMER PROPERLY. GRASP THE HAMMER HANDLE FIRMLY NEAR THE END.
4. CHECK THE FACE OF THE HAMMER TO SEE THAT IT IS CLEAN AND THAT IT IS NOT SPLIT, CHIPPED, OR MUSHROOMED.
5. DO NOT STRIKE WITH THE CHEEK OF THE HAMMER.
6. DO NOT STRIKE A HARDENED STEEL SURFACE WITH A HAMMER.
7. USE THE CLAW FOR PULLING NAILS; NOT AS A PRY OR WEDGE, OR FOR PULLING SPIKES.
8. DO NOT USE A HAMMER BEYOND ITS CAPACITY.
9. STORE HAMMERS IN A DESIGNATED PLACE IN THE TOOLBOX.

USE OF THE CLAW HAMMER



1. CORRECT WAY TO HOLD A HAMMER.



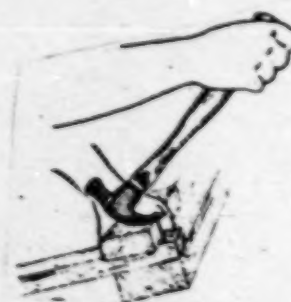
2. THE BLOW IS DELIVERED THROUGH THE WRIST, THE ELBOW AND THE SHOULDER, ONE OR ALL BEING BROUGHT INTO PLAY, ACCORDING TO THE STRENGTH OF THE BLOW TO BE STRUCK.



3. ALWAYS STRIKE WITH THE FACE OF THE HAMMER, IT IS HARDENED FOR THAT PURPOSE.



4. TO DRAW A NAIL, SLIP THE CLAW OF THE HAMMER UNDER THE NAIL HEAD, PULL UNTIL THE HANDLE IS NEARLY VERTICAL AND THE NAIL PARTLY DRAWN.

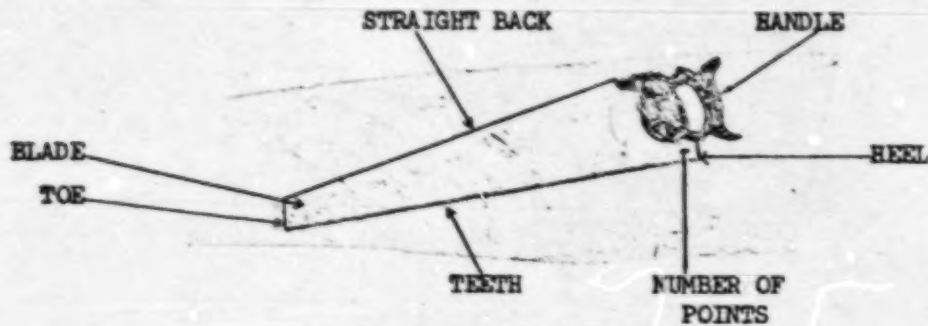


5. SLIP A PIECE OF WOOD UNDER THE HEAD TO INCREASE THE LEVERAGE AND TO RELIEVE UNNECESSARY STRAIN ON THE HANDLE.

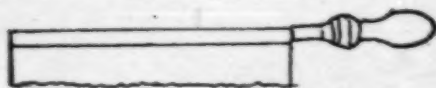
HAND TOOLS

Pg. 7

USE OF THE HANDSAW



1. KEEP YOUR ATTENTION FOCUSED ON THE WORK AREA.
2. KEEP SAW BLADES SHARP AND PROPERLY SET.
3. USE THE RIGHT SAW FOR THE JOB.
4. MAKE SURE THAT THE MATERIAL BEING CUT IS FREE FROM NAILS AND OTHER OBSTRUCTIONS.
5. BE SURE THAT THE MATERIAL BEING CUT IS WELL SUPPORTED.
6. USE SAWS PROPERLY. START CUT BY DRAWING SAW BACKWARD.
7. AFTER USING SAW, WIPE ON A THIN FILM OF OIL TO PREVENT RUST.
8. STORE SAWS IN A DESIGNATED PLACE IN THE TOOL BOX TO PROTECT THE TEETH OR HANG IN A DESIGNATED LOCATION.



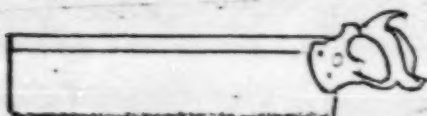
DOVETAIL SAW



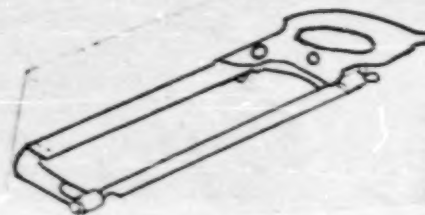
COPING SAW



COMPASS SAW



BACK SAW



HACK SAW

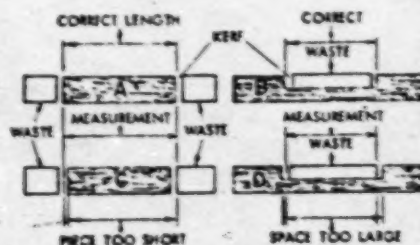
HAND TOOLS

Pg. 8

USE OF THE HANDSAW



ABOUT 45° IS THE CORRECT ANGLE BETWEEN THE SAW AND THE WORK FOR CROSSCUT SAWING.



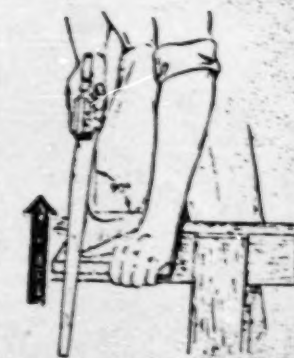
BE SURE TO SAW CAREFULLY ON THE WASTE-SIDE OF THE LINE AS AT A & B. SAWING ON THE LINE OR ON THE WRONG SIDE OF THE LINE MAKES THE STOCK TOO SHORT AS AT C OR THE OPENING TOO LARGE AS SHOWN AT D.

PROPER USE OF THE RIPSAW



A. IF THE SAW LEAVES THE LINE TWIST THE HANDLE SLIGHTLY AND DRAW IT BACK TO THE LINE.

B. IF THE SAW IS NOT SQUARE TO THE STOCK, BEND IT A LITTLE AND GRADUALLY STRAIGHTEN IT. BE CAREFUL NOT TO PERMANENTLY BEND OR KINK THE BLADE.

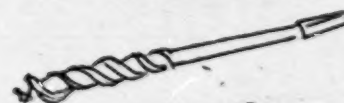


START THE SAW CUT DRAWING THE SAW BACKWARD. HOLD THE BLADE SQUARE TO THE STOCK. STEADY IT AT THE LINE WITH THE THUMB.

USE OF RATCHET BRACE AND BITS



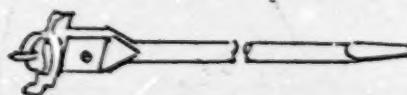
BRACE



AUGER BIT



LOCK SET BIT



EXPANSIVE BIT



SCREWDRIVER BIT



BIT EXTENSION

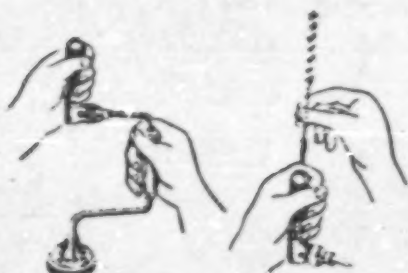


FORSTNER BIT

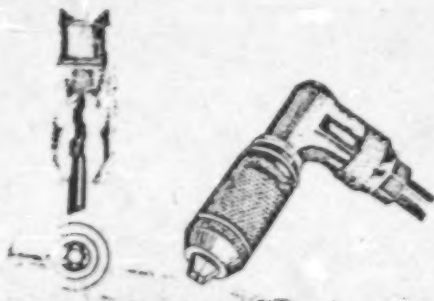


COUNTERSINK BIT

BRACE AND BIT



TO PLACE THE BIT IN THE CHUCK GRASP THE CHUCK SHELL AND TURN HANDLE TO THE LEFT UNTIL THE JAWS ARE WIDE OPEN, INSERT THE BIT SHANK IN THE SQUARE SOCKET AT THE BOTTOM OF THE CHUCK AND TURN THE HANDLE TO THE RIGHT UNTIL THE BIT IS HELD FIRMLY IN THE JAWS.



BIT BRACK SHUCKS OF THE ABOVE DESIGN WITHOUT A SQUARE SOCKET ARE OPERATED IN LIKE MANNER. THE CORNERS OF THE TAPER SHANK OF THE BIT SHOULD BE CAREFULLY SEDATED AND CENTERED IN THE V GROOVE OF THE JAWS.



TO BORE A HORIZONTAL HOLE, HOLD THE HEAD OF THE BRACE CUPPED IN THE LEFT HAND AGAINST THE STOMACH AND WITH THE THUMB AND FOREFINGER AROUND THE QUILL TO BORE THRU WITHOUT SPLINTERING THE SECOND FACE, STOP WHEN THE SCREW POINT IS THRU AND FINISH FROM THE OTHER SIDE.

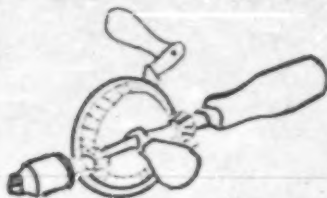


TO OPERATE THE RATCHET TURN THE CAM RING. TURNING THE CAM RING TO THE RIGHT WILL ALLOW THE BIT TO TURN RIGHT AND GIVE THE RATCHET ACTION. WHEN THE HANDLE IS TURNED LEFT TURN THE CAM RING LEFT TO REVERSE THE ACTION.



TO BORE A VERTICAL HOLE, HOLD THE BRACE AND BIT PERPENDICULAR TO THE SURFACE OF THE WORK. TEST BY SIGHT. COMPARE THE DIRECTION OF THE BIT TO THE NEAREST STRAIGHT EDGE OR TO SIDES OF THE VISE.

USE OF DRILLS AND DRILL BITS



HAND DRILL



BREAST DRILL

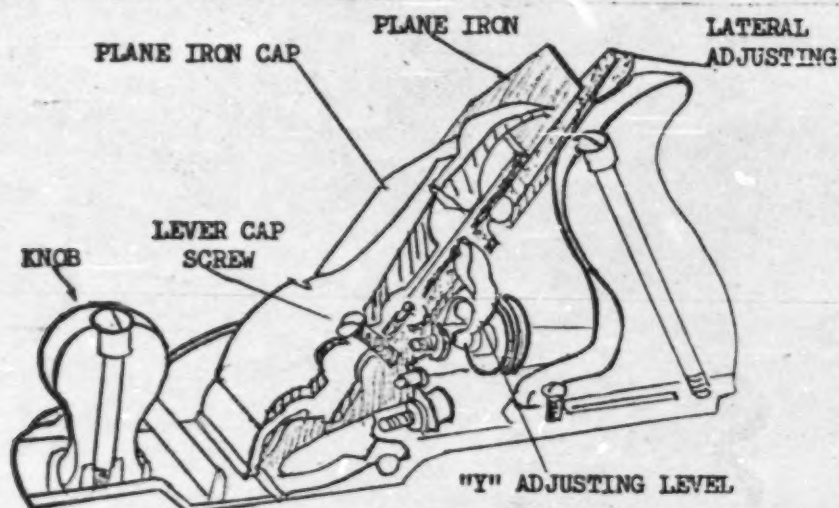


BUTTERFLY BIT

HAND TOOLS

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USE OF PLANES



PARTS OF THE PLANE



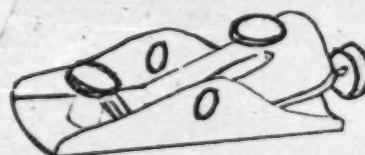
JACK PLANE



JOINTER PLANE



SMOOTH PLANE



BLOCK PLANE

HAND TOOLS

Pg. 13

USE OF PLIERS AND SNIPS

SAFETY: PLIERS



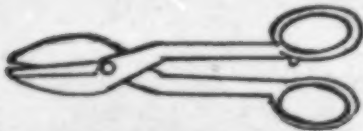
COMBINATION PLIERS

1. KEEP YOUR ATTENTION FOCUSED ON THE WORK.
2. USE PLIERS PROPERLY. GRIP THEM CLOSE TO THE ENDS TO PREVENT BEING PINCHED BY THE HINGE.
3. DO NOT USE PLIERS AS A WRENCH.
4. STORE PLIERS IN THEIR DESIGNATED PLACE IN THE TOOL BOX.



SIDE CUTTING PLIERS

SAFETY: TIN SNIPS



TIN SNIPS

1. KEEP YOUR ATTENTION FOCUSED ON THE WORK.
2. KEEP FINGERS OUT OF THE SPACE BETWEEN THE HANDLES.
3. HOLD METAL FIRMLY TO PREVENT IT FROM SLIPPING AND CUTTING THE HAND.
4. STORE TIN SNIPS IN THEIR DESIGNATED PLACE IN THE TOOL BOX.



CARPENTER'S PINCHERS

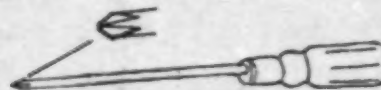
HAND TOOLS

Pg. 14

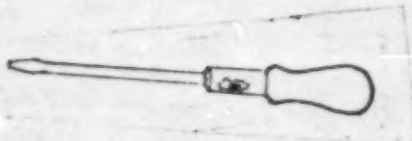
USE OF SCREWDRIERS



SCREWDRIIVER



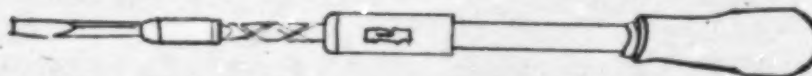
PHILLIPS SCREWDRIIVER



RATCHET SCREWDRIIVER



SCREWDRIIVER BITS

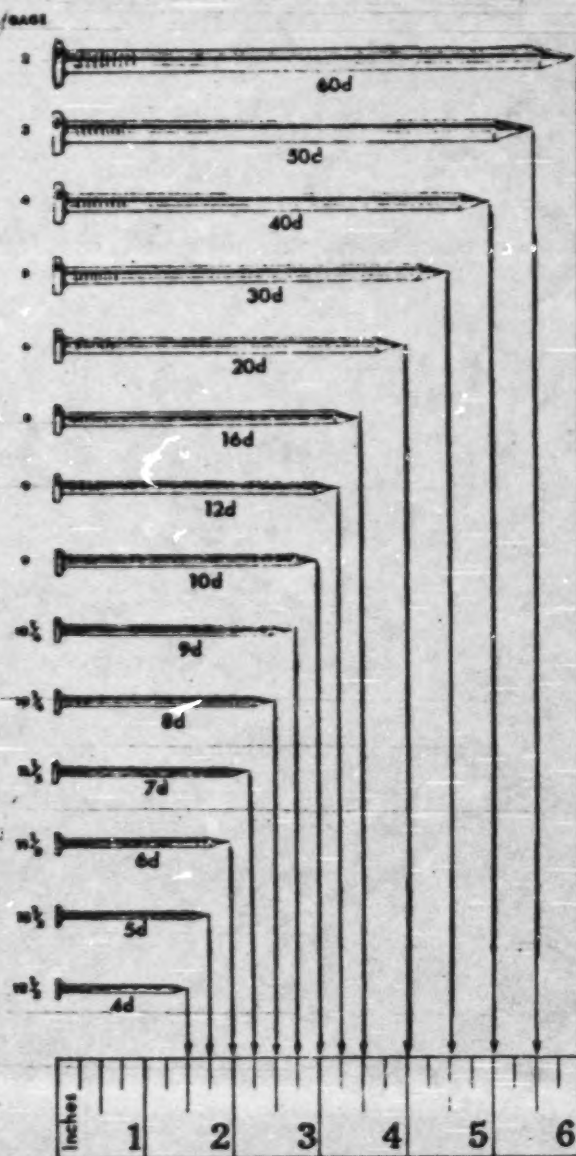


SPIRAL RATCHET SCREWDRIIVER

SAFETY: SCREWDRIERS

1. KEEP YOUR ATTENTION FOCUSED ON THE WORK.
2. USE ONLY SCREWDRIERS THAT ARE IN GOOD CONDITION AND OF THE CORRECT SIZE AND LENGTH.
3. THE BLADE TIP SHOULD BE PROPERLY GROUND AND SHAPED.
4. USE A SCREWDRIIVER PROPERLY. HOLD THE SCREWDRIIVER IN LINE WITH THE SCREW.
5. NEVER HOLD WORK IN YOUR HAND WHEN TIGHTENING A SCREW.
6. USE AN AWL OR NAIL TO MAKE THE STARTING HOLES FOR SMALL SCREWS IN SOFT WOOD.
7. AVOID HOLDING A SCREW WITH YOUR FINGERS WHEN IT IS BEING STARTED.
8. KEEP FINGERS AWAY FROM THE TIP OF THE SCREWDRIIVER.
9. USE INSULATED SCREWDRIERS AROUND ELECTRICAL WORK.
10. DO NOT CARRY SCREWDRIERS IN YOUR POCKET.
11. STORE SCREWDRIERS IN THEIR DESIGNATED PLACE IN THE TOOLBOX.

NAILS



CARPENTRY TRIM CONSTRUCTION AND MAINTENANCE

Pg. 2

NAIL SIZES AND WEIGHTS

LENGTH AND GAGE		APPROXIMATE NUMBER TO POUND
SIZE	INCHES	
60D	6	11
50D	5-1/2	14
40D	5	18
30D	4-1/2	24
20D	4	31
16D	3-1/2	49
12D	3-1/4	63
10D	3	69
9D	2-3/4	96
8D	2-1/2	106
7D	2-1/4	161
6D	2	181
5D	1-3/4	271
4D	1-1/2	316

NAILS AND STAPLES

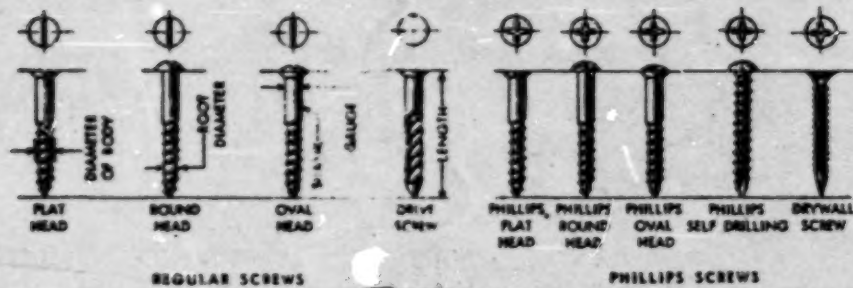


SOME SPECIAL TYPES OF NAILS

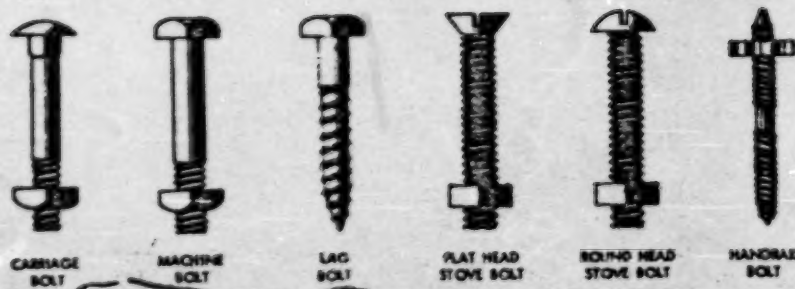


NAILS AND STAPLES FOR SPECIAL USES

SCREWS AND BOLTS



STYLES OF STANDARD WOOD SCREWS



TYPES OF COMMONLY USED BOLTS

DADE COUNTY PUBLIC SCHOOLS
1410 NORTHEAST SECOND AVENUE
MIAMI, FLORIDA 33132

VOCATIONAL EXEMPLARY PROGRAM

INSTRUCTIONAL PACKAGE

FOR

CAREERS IN CONSTRUCTION, BUILDING
MAINTENANCE AND ALLIED OCCUPATIONS

INTRODUCTION TO

Building Plans



THE DIVISION OF
VOCATIONAL, TECHNICAL AND ADULT EDUCATION

Suggested Format
for
Instructors

I. OBJECTIVES

A. Plans and Definitions

Students will be able to define the four basic plans by labeling each plan properly.

B. Types of Plans

Student will show basic understanding of types of plans by:

Drawing small plot, foundation, floor, and roof framing plans.

Reading and interpreting measurements of rooms and building by filling in measurements of rooms on plans prepared in above objective.

C. Identification of Parts

Student will name the various elements (beams, columns, etc.) which will make up the building as indicated in the pre-prepared plans.

II. PRETEST

1. Define the word "plan"
2. What are "utilities"?
3. What is a "datum point?"
4. What does "finish grade" mean?
5. What is a "hip rafter?"
6. What is meant by master bedroom?
7. How long is 25/100 of a foot?
8. Change to inches .375'
9. What does horizontal mean?
10. Draw a house floor plan with 1 bedroom, 1 bathroom, kitchen and living room.

III. SUGGESTED SUBJECT FORMAT

A. Preparation of Plans
Teacher will:

1. Show large plan and use in conjunction with students plan.
2. Give reasons for plans and show how they are to be used.
3. Explain how information is gathered and plans are drawn.

BLOCK II UNIT B

BUILDING PLANS (CONT'D)

Pg. 2

B. Types of Plans

Teacher will:

1. Compare large comparable drawings with students' plan
2. Show different kinds of plans and name each.
 - a. Explain each
 - b. Explain how to be used
3. Have student label types of plans.

C. Definition and Exercises

Teacher will:

1. Define the four kinds of plans:
 - a. Plot
 - b. Foundation
 - c. Floor
 - d. Roof
2. Show difference in four kinds of plans:
3. Study parts of plot plan:
 - a. Datum point
 - b. Existing grades
 - c. Finish grades
 - d. Measurements
 - e. Utilities
 - f. Lot size
 - g. Building placement
 - h. Direction
4. Study parts of foundation plan:
 - a. Footings
 - b. Columns
 - c. Steel reinforcements
 - d. Slab
 - e. Mesh
5. Floor plan:
 - a. Rooms
 - b. Measurements
 - c. Location of rooms
 - d. Sizes of rooms
6. Roof plan:
 - a. Number of rafters
 - b. Layout of rafters
 - c. Hips
 - d. Valley
 - e. Common
 - f. Ridge
 - g. Jacks
7. Have students read all measurements
8. Have students add all measurements

BLOCK II UNIT B

BUILDING PLANS (CONT'D)

Pg. 3

9. Have students complete missing details to plans:
 - a. Cabinets
 - b. Showers
 - c. Stools
 - d. Doors
 - e. Windows
 - f. Sinks
 - g. Closets
 - h. Lavatories
10. Have student draw one of each of the four types of plans in detail
11. Have student explain his own plan

IV. POST TESTING OF STUDENT:

1. Define "datum point"
2. Define "finish grade"
3. Name 3 sizes of steel
4. What is a "slab?"
5. What are "utilities?"
6. Name the four types of plans
7. What is a septic tank?
8. What is a lavatory?
9. Draw a plot plan and complete all parts and measurements
10. Draw a 2 bedroom, 1 bath floor plan in detail

BLOCK II UNIT E BUILDING PLANS - INTRODUCTION

Pg. 4

PLAN

A HORIZONTAL VIEW OF A BUILDING OR PARTS OF A BUILDING. IF YOU WERE TO TAKE A GIANT SAW AND CUT AROUND A BUILDING, TAKE OFF THE TOP AND LOOK DOWN INSIDE, WHAT YOU WOULD SEE IS A PLAN.

TYPES OF PLANS

- A. PLOT PLAN
- B. FOUNDATION PLAN
- C. FLOOR PLAN
- D. ROOF FRAMING PLAN

DEFINITIONS

- A. PLOT PLAN - WHAT THE WHOLE BUILDING AND PROPERTY AROUND, WILL LOOK LIKE AFTER BEING FINISHED. (FIG. #1)
- B. FOUNDATION PLAN - WHAT THE SUPPORTING MEMBERS OF THE BUILDING LOOK LIKE AND WHAT THEY ARE MADE OF (FIG. #2)
- C. FLOOR PLAN - HOW THE FLOORS, WALLS, AND ROOMS ARE CONSTRUCTED. WHAT MATERIALS ARE USED IN CONSTRUCTION. (FIG #3)
- D. ROOF FRAMING - WHAT MATERIALS ARE NEEDED AND HOW ROOF IS CONSTRUCTED (FIG. #4)

Plot Plan - Fig. 1

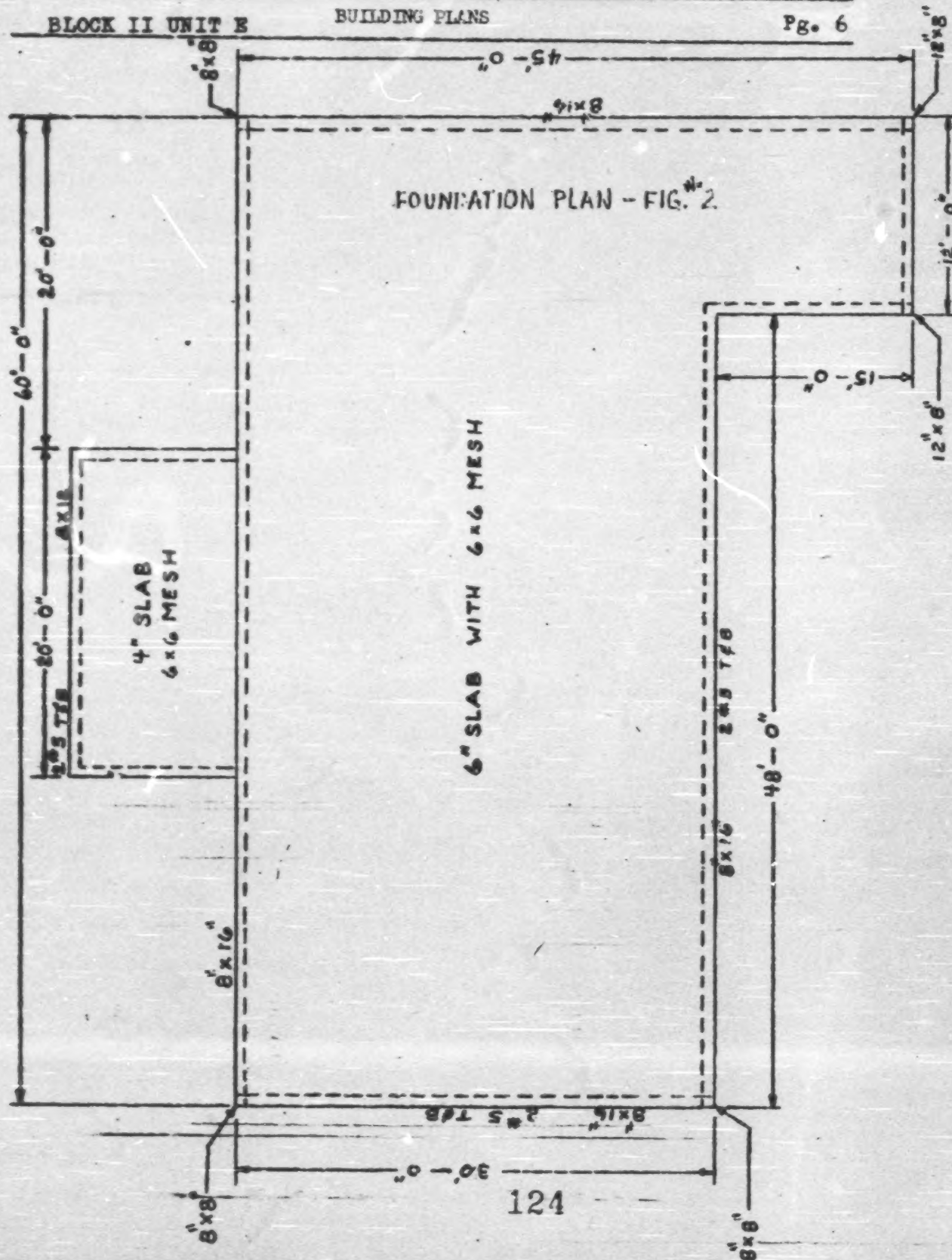
The plan shows a residential lot with the following dimensions and features:

- Overall Dimensions:**
 - Front: 150'-0"
 - Left: 60'-0"
 - Right: 75'-0"
 - Back: 30'-0"
- Internal Dimensions and Features:**
 - Front Yard: 20'-0" (left), 20'-0" (center), 20'-0" (right)
 - Patio: 10'-0" wide, 20'-0" deep
 - Drain Field: 30'-0" wide, 10'-0" deep
 - Water: 12'-0" wide
 - Sidewalk: 15'-0" wide
 - Drive: 12'-0" wide
 - Back Yard: 30'-0" wide, 25'-6" deep
- Other Features:**
 - Lot 5.5 (top left)
 - Lot 5.5 (top right)
 - Lot 5.5 (bottom left)
 - Lot 5.5 (bottom right)
 - Lot 5.6 (center)
 - Lot 5.7 (left)
 - Lot 123 (right)

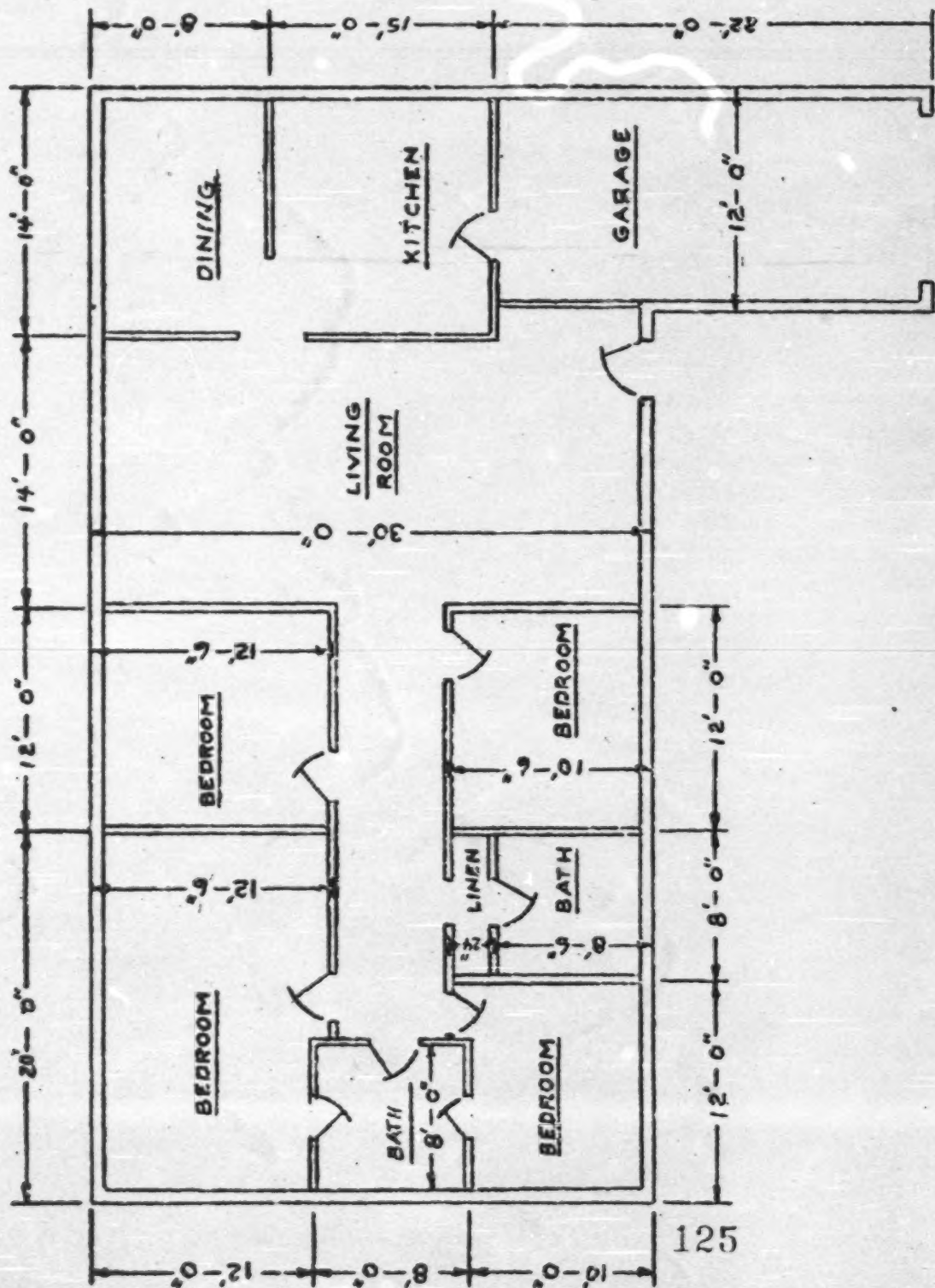
BLOCK II UNIT B

BUILDING PLANS

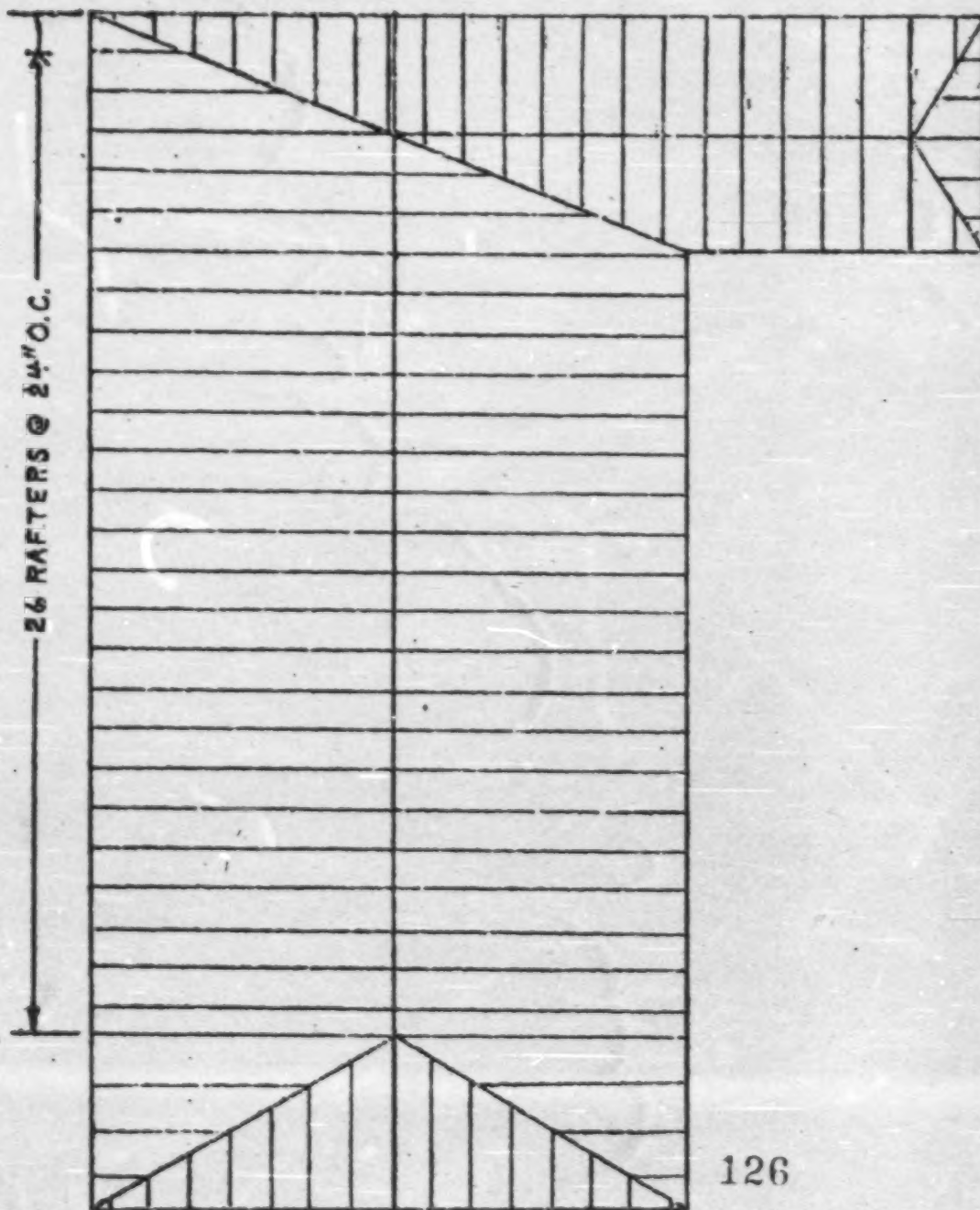
Pg. 6



FLOOR PLAN-FIG. #3



ROOF FRAMING PLAN - FIG. #4



BLOCK II UNIT B

BUILDING PLANS - INTRODUCTION

Pg. 9

TO THE STUDENT:

USE THE FOLLOWING DIMENSIONS TO FILL IN THE MEASUREMENTS ON
PLOT PLAN, FOUNDATION PLAN AND FLOOR PLAN.

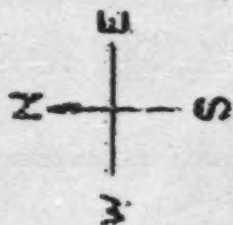
1. LOT SIZE E TO W	85'0"
2. LOT SIZE N TO S	100'0"
3. FRONT SETBACK	30'0"
4. DATUM POINT	3.5
5. FINISH GRADE	5.5
6. EXISTING GRADE (AVERAGE)	4.1
7. BUILDING SIZE E TO W	65'0"
8. BUILDING SIZE N TO S	50'0"
9. ELECTRIC	SW
10. SEPTIC TANK	NE
11. DRIVE	8'0"
12. SIDEWALK	3'0"
13. SIDEWALK FROM STREET	3'0"
14. SLAB	6"
15. REINFORCEMENT STEEL	#5
16. MESH SIZE	6 x 6 /10
17. FOOTING SIZE	10" x 16"
18. COLUMNS	8" x 12"
19. CORNER COLUMNS	8" x 8"
20. WINDOW SIZE	4'0"
21. GARAGE DOOR	16'0"
22. EXTERIOR DOOR SIZE	3'0"
23. INTERIOR DOOR SIZE	2'8"
24. BATHROOM SIZE	8' x 10'
25. BEDROOM SIZE	20'0" x 17'0"
26. BEDROOM SIZE	14'0" x 17'0"
27. BEDROOM SIZE	16'0" x 16'0"
28. LIVING ROOM SIZE	20'0" x 24'0"
29. GARAGE SIZE	24'0" x 25'0"
30. KITCHEN & DINING ROOM SIZE	24'0" x 25'0"
31. DEN SIZE	16'0" x 16'0"

Change

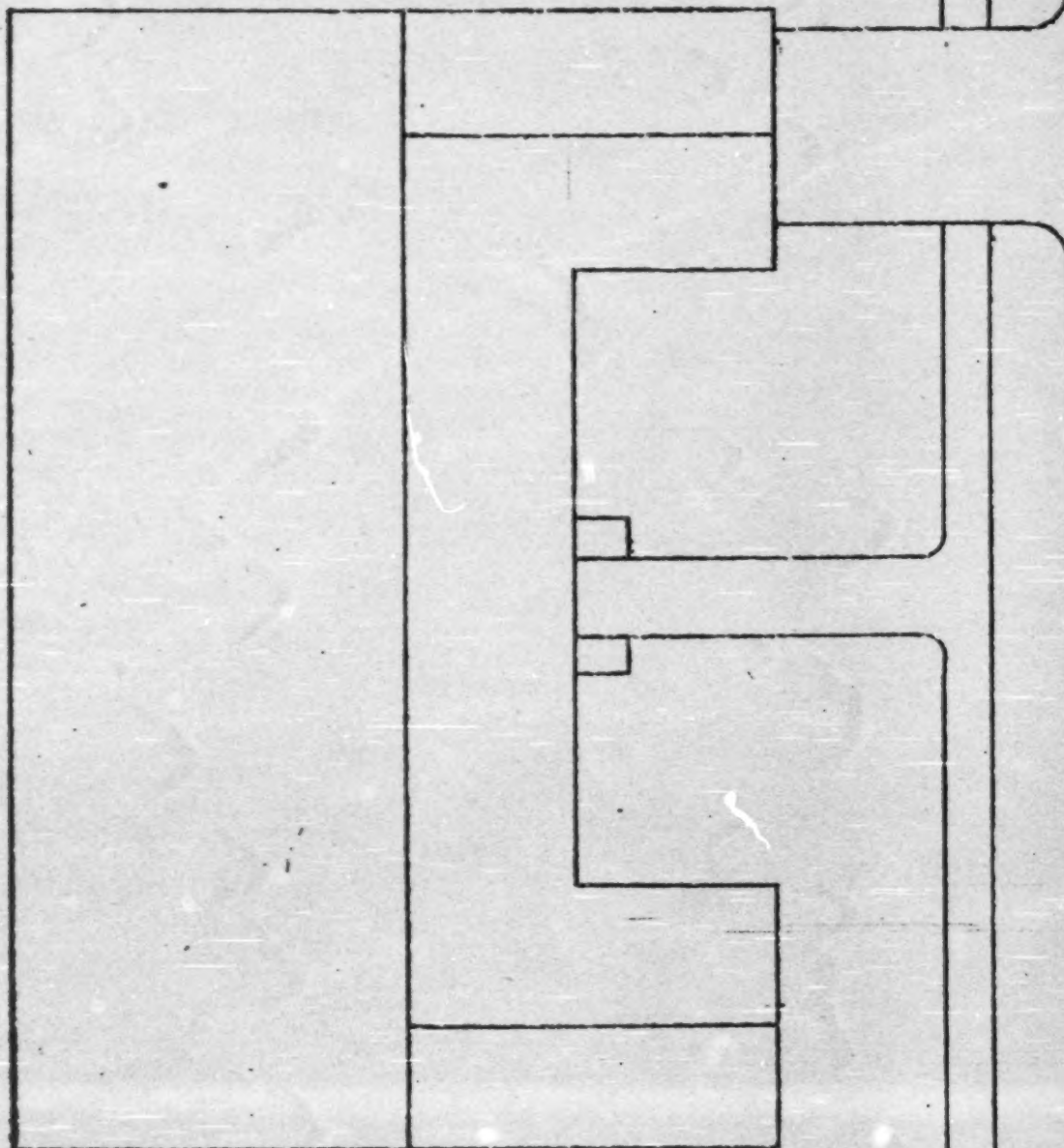
BLOCK III UNIT B

BUILDING PLANS

Pg. 10

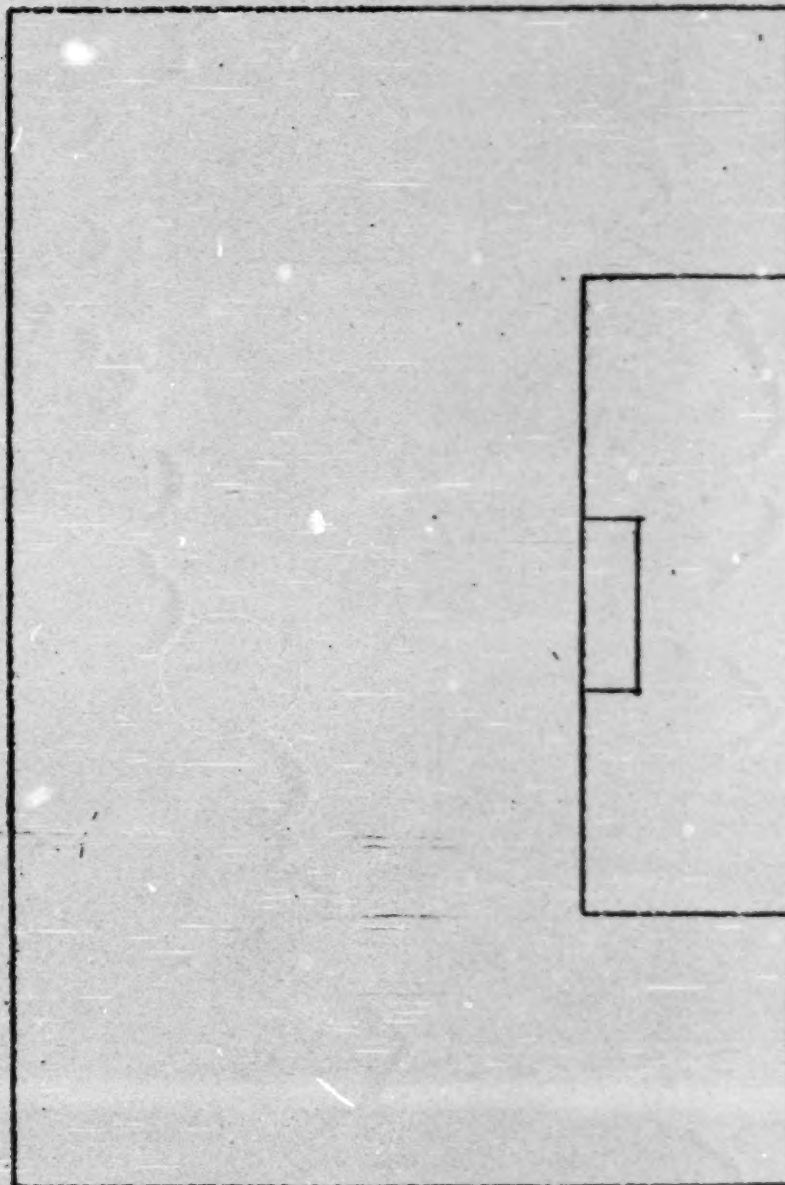


PLOT PLAN



STREET

FOUNDATION PLAN

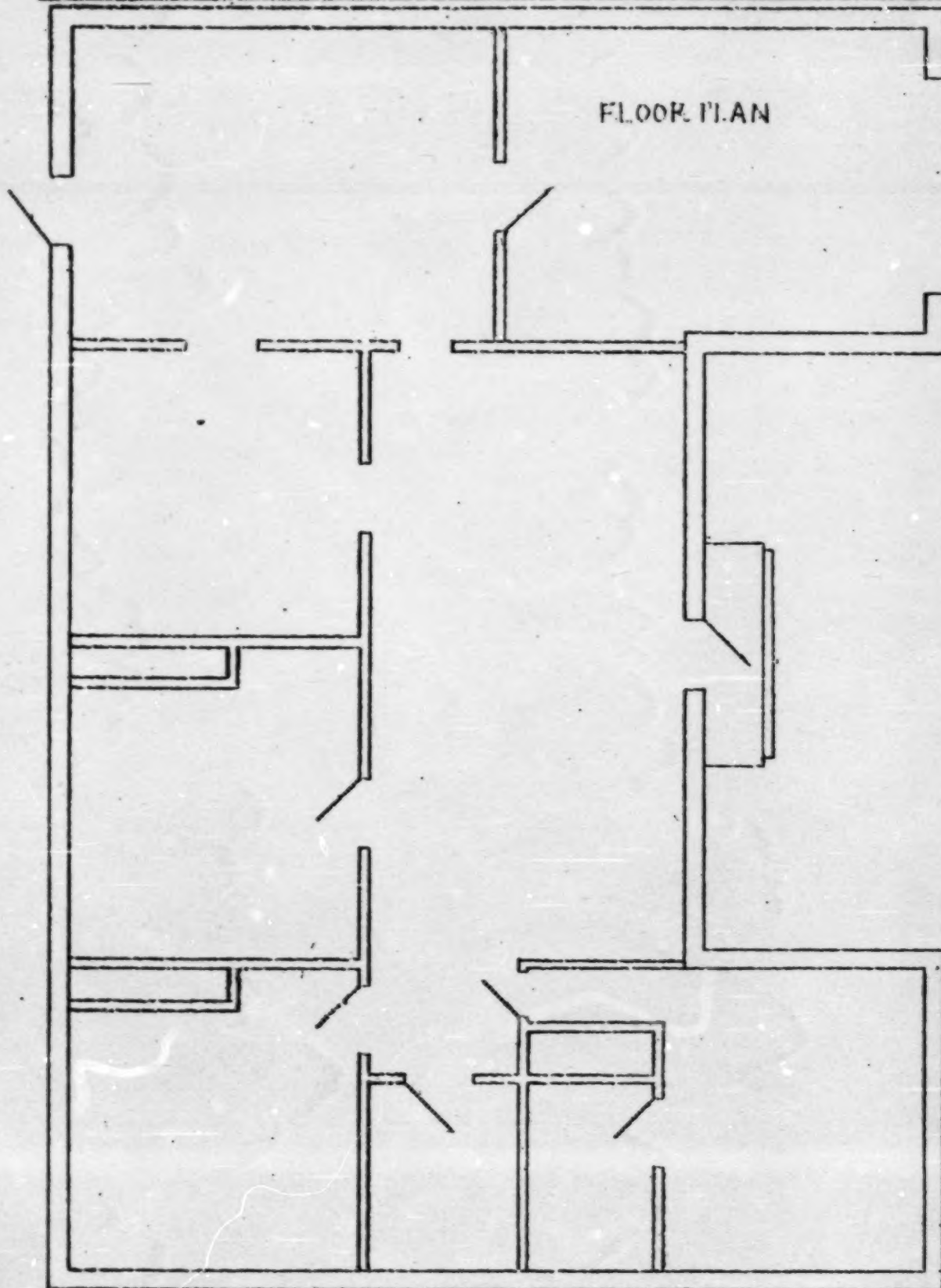


BLOCK II UNIT B

BUILDING PLANS

Pg. 12

FLOOR PLAN



LESSON PLAN FOR INSTRUCTOR

PREPARATION BY INSTRUCTOR

BUILD BASE WITH 2 SHEETS OF PLYWOOD, SETTING PLYWOOD ON 2 x 6's FLAT-WISE.
CUT DIAGONALLY INTO TWO PIECES. INSTALL FOUR FLAT CASTERS TO BOTTOM.
(DETAIL DRAWING FOR THIS ATTACHED).

STUDENT OBJECTIVES

STUDENT WILL:

1. CONSTRUCT A SAW HORSE USING PRE-DRAWN PLAN, USING PROPER PROCEDURES AND CORRECT TOOLS. (INSTRUCTOR'S EVALUATION)
2. CUT A 2 x 4, FOLLOWING A SQUARE LINE AS A GUIDE.
3. BE ABLE TO CONSTRUCT A FRAME WALL USING PRE-DRAWN PLANS, AND PROPER TOOLS AND PROCEDURES (INSTRUCTOR'S EVALUATION).
4. LAYOUT AND FRAME WALL WHEN GIVEN PROPER MEASUREMENTS.

STUDENT WILL SHOW HIS UNDERSTANDING OF FRAMING BY:

1. ACHIEVING A 70% SCORE ON A WRITTEN TEST COVERING MATERIALS AND TOOLS.
2. NAMING THE PARTS OF A FRAME WALL WITH 70% OF THE PARTS CORRECT.

REASONS FOR OBJECTIVES

1. TO ENABLE THE STUDENT TO BETTER HIS KNOWLEDGE OF CONSTRUCTION.
2. TO TEACH THE STUDENT TO SELECT MATERIALS.
3. TO ENLIGHTEN THE STUDENT IN TRADE SKILLS.

LEARNING ACTIVITIES

IN THE FOLLOWING PACKAGE THE STUDENT WILL BE GIVEN A PROJECT IN THE CONSTRUCTION OF A SAW HORSE AND A FRAME WALL. THE PACKAGE ALSO COVERS MATERIALS AND TOOLS NEEDED IN THE CONSTRUCTION OF BOTH THE PROJECTS.

EVALUATION

THE STUDENT SHOULD BE UNDER EVALUATION THROUGHOUT BOTH HIS PROJECTS. CLOSE ATTENTION SHOULD BE PAID TO SKILL, KNOWLEDGE OF SUBJECT AND ACCURACY. A WRITTEN TEST FOR THIS PACKAGE SHOULD BE GIVEN AS WELL AS CLOSE APPRAISAL OF HIS MANIPULATIVE SKILLS.

INSTRUCTOR WILL:

1. INSTRUCT STUDENTS IN THE USE OF THE TOOLS NEEDED (EXCEPT HAND LEVEL):
 - a. HAMMER
 - b. FOLDING RULE
 - c. CROSS-CUTT SAW
 - d. SQUARE
2. INSTRUCT STUDENT ON TYPES OF MATERIALS TO BE USED:
 - a. PLYWOOD:
 - (1) SIZE (3/4" x 4' x 8')
 - (2) USES
 - b. 2 x 4's:
 - (1) SIZE (1-5/8" x 3-5/8" ASSORTED LENGTHS)
 - (2) USES
 - c. 2 x 6's:
 - (1) SIZE (1-5/8" x 5-5/8")
 - (2) USES
 - d. NAILS:
 - (1) COMMONS
 - (2) FINISH)
 - (3) CASING) #16 - 8 - 6
 - (4) SPECIAL NAILS
3. INSTRUCT STUDENTS ON DEFINITIONS OF TERMS:
 - a. STUDS:
 - (1) SIZE
 - (2) USES
 - b. DECKING:
 - (1) SIZE
 - (2) USES
 - c. PLATE:
 - (1) SIZE
 - (2) USES
 - d. SHOE:
 - (1) SIZE
 - (2) USES

FRAMING

Pg. 3

e. DOOR FRAMING:

- (1) TRIMMER
- (2) HEADER

4. TEAM STUDENTS IN GROUPS OF FOUR:

- a. FOREMAN (1): WILL TAKE CHARGE OF CREW AND ASSIGN WORK, READ INSTRUCTIONS AND EXPLAIN THEM TO CREW, AND WILL BE RESPONSIBLE FOR THE CLEAN-UP OF THE AREA EACH DAY.
- b. WORKERS (2): WILL BE RESPONSIBLE TO THE FOREMAN AND WILL CARRY OUT HIS INSTRUCTIONS. THEY WILL DO THE ACTUAL WORK ON THE PROJECT AND CLEAN THE AREA DAILY.
- c. APPRENTICE (1): WILL BE RESPONSIBLE TO THE FOREMAN AND WORKERS. HE WILL OBTAIN PROPER TOOLS AND RETURN THEM (CHECKING TO MAKE SURE NONE ARE MISSING). HE WILL KEEP AN ADEQUATE SUPPLY OF MATERIALS ON HAND FOR THE WORKERS. HE WILL NOT HELP CLEAN UP.
- d. THE FOREMAN, WORKERS AND APPRENTICE SHOULD BE ROTATED DAILY TO GIVE EACH STUDENT AN OPPORTUNITY OF GAINING EXPERIENCE IN EACH JOB.

5. PROJECT WORK:

- a. MAKE SURE NECESSARY MATERIALS AND TOOLS ARE AVAILABLE FOR STUDENTS.
- b. SUPERVISE ALL WORK AND SEE THAT ALL STUDENTS PERFORM DUTIES PROPERLY.
- c. HELP EACH GROUP WHEN CALLED UPON TO DO SO BY STUDENTS.
- d. DO NOT DO THE WORK FOR STUDENTS.
- e. CORRECT UNSAFE WORK HABITS.
- f. SEE THAT EACH STUDENT RECEIVES A TURN AT EACH JOB.

6. FRAMING:

FOLLOW PROCEDURE UNDER "PROJECT WORK" ABOVE FOR:

- a. WALL CONSTRUCTION
- b. FIRE BLOCKING
- c. DOOR FRAMING
- d. CORNERS:

- 1. TEACHER WILL SHOW STUDENT HOW TO PLUMB CORNERS
- 2. TEACHER WILL SHOW STUDENT HOW TO NAIL CORNERS.

FRAMING

Pg. 4

Date _____ Time _____ Started

Suggested Completion Time _____

Date _____ Time _____ Completed

STUDENT'S NAME _____
(Last) (First)

CLASS/SECTION _____

PRE-TEST _____

STUDENT OBJECTIVES

THE STUDENT WILL:

1. BE ABLE TO CONSTRUCT SAW HORSE.
2. BE ABLE TO CONSTRUCT A FRAME WALL.
3. BE ABLE TO IDENTIFY AND SELECT MATERIALS AND TOOLS FOR FRAMING WALLS.
4. SHOW THAT HE HAS LEARNED THE PROPER TERMS USED IN WALL CONSTRUCTION.
5. TO PLAN AND LAYOUT A FRAME WALL.

REASONS FOR OBJECTIVES

1. TO ENABLE THE STUDENT TO BETTER HIS KNOWLEDGE OF BASIC CONSTRUCTION.
2. TO INFORM THE STUDENT HOW TO SELECT MATERIALS.
3. TO HELP THE STUDENT IMPROVE IN HIS TRADE SKILLS.

LEARNING ACTIVITIES

IN THE FOLLOWING PACKAGE THE STUDENT WILL BE INSTRUCTED IN THE CONSTRUCTION OF A SAW HORSE, FRAME WALL AND THE SELECTION OF MATERIALS USED IN THESE PROJECTS.

EVALUATION

THE STUDENT WILL BE EVALUATED BY THE INSTRUCTOR THROUGHOUT THE PROJECT. A WRITTEN TEST COVERING TERMS, MATERIALS, TOOLS AND THE DIFFERENT TYPES OF WALL CONSTRUCTION WILL BE GIVEN AT THE END OF PACKAGE.

FRAMING

Pg. 5

POST TEST

1. A STUD IS _____
 - A. A HORIZONTAL 2" x 4"
 - B. A VERTICAL 2" x 4"
 - C. A PIECE THAT GOES AROUND THE DOOR
2. A HEADER IS _____
 - A. A PLUMBING TERM
 - B. HOLDS UP THE PLATE
 - C. SITS ON THE TRIMMERS
3. A CRIPPLE _____
 - A. IS PART OF THE ROOF
 - B. SITS OVER THE HEADER
 - C. IS PART OF THE SHOE
4. FIRE BLOCKS ARE _____
 - A. TO STOP FIRES
 - B. TO STOP UPDRAFTS AND SET BETWEEN THE STUDS
 - C. MADE OF SQUARE PIECES OF METAL
5. NAME THE TOP AND BOTTOM 2 x 4's OF A STUD WALL _____
6. WHAT TOOL DO YOU USE TO GET THE CORNER PLUMB ? _____
7. WHAT IS THE SIZE OF A STUD ? _____
8. WHAT ARE THE PIECES SET UNDER THE HEADER CALLED ? _____
9. WHAT IS USED FOR PUTTING STRAIGHT LINES ON A ROW OF STUDS CALLED ? _____
10. THE TOOL USED FOR PUTTING A STRAIGHT LINE ON A 2 x 4 IS A _____.

MATERIAL LIST

MATERIAL	SIZE	TYPE	QUANTITY
2" X 4"	10'-0"		2
2" x 4"	8'-0"		30
PLYWOOD	4'-8"	3/4"	2
2" x 6"	8'-0"		6
2" x 6"	10'-0"		2
NAILS	16D	COMMON	10 lbs.
NAILS	8D	COMMON	1/2 lb.
CLIPS		HURRICANE	10 sets
CASTERS		FLAT BASE	4

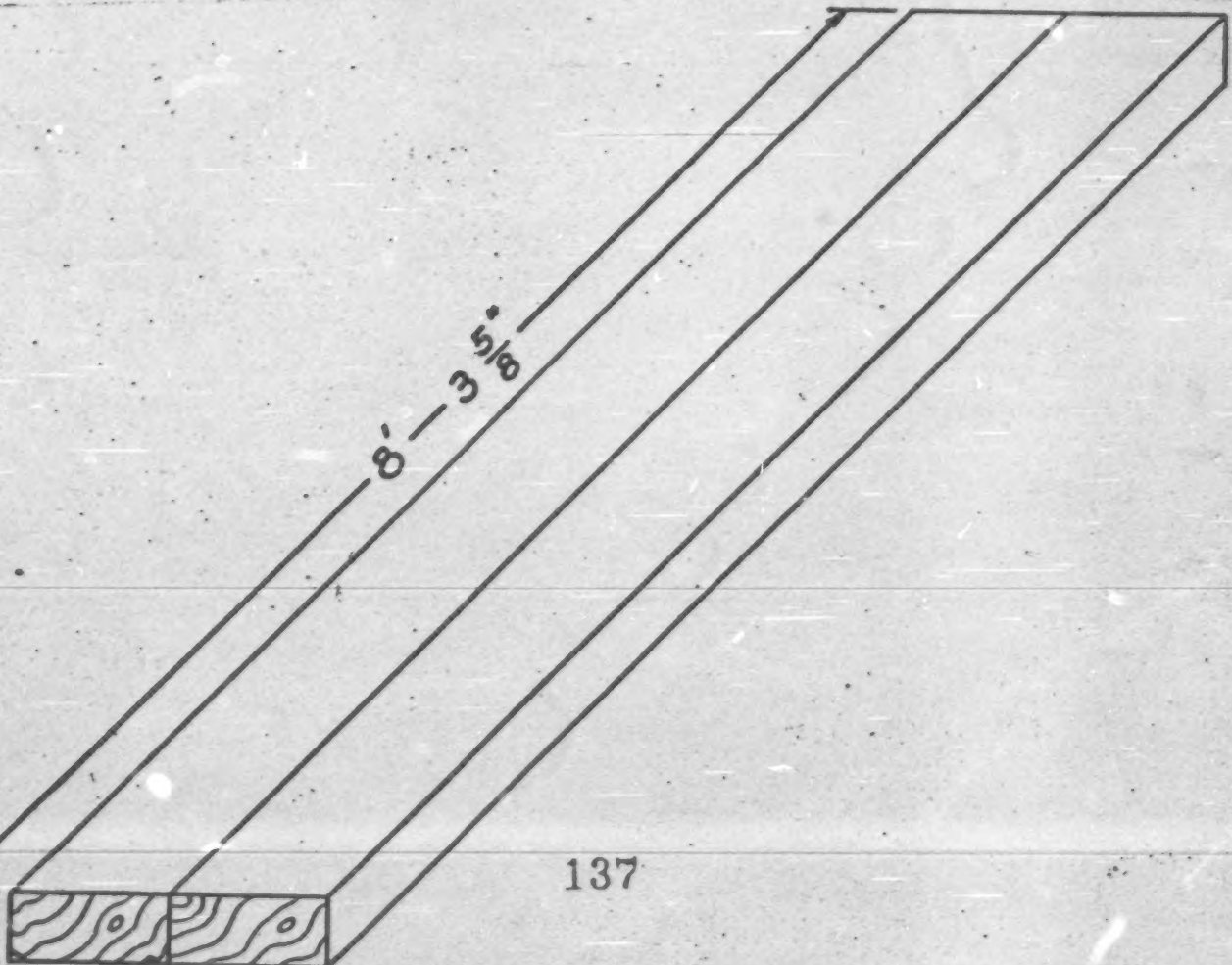
TOOL LIST

MATERIAL	SIZE	TYPE	QUANTITY
HAMMER		16 oz.	4
RULE	6 FT.	FOLDING	4
SAW		CROSSCUT	2
LEVEL		28"	1
PENCIL			5
	136		

CUTTING SHOES AND PLATES

STEPS:

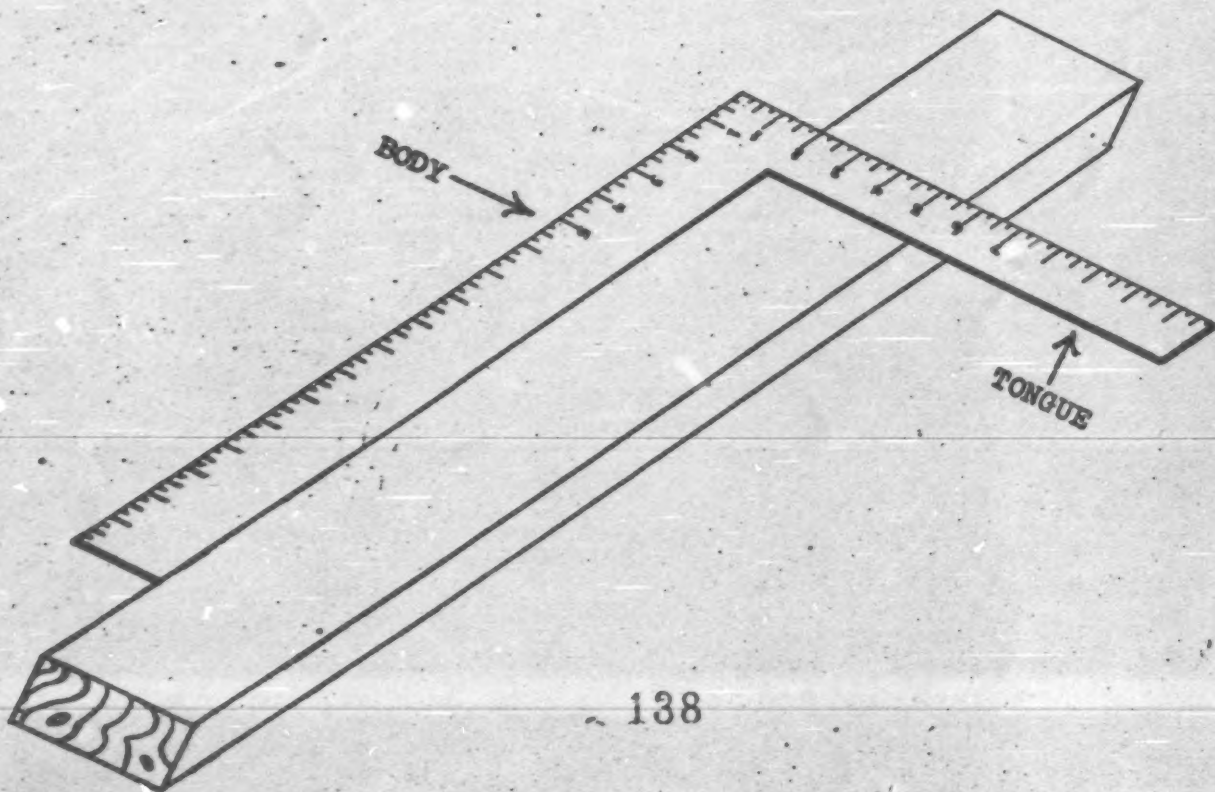
1. TAKE TWO 2 x 4's THAT ARE 10 FEET LONG.
2. MEASURE 8 FEET 3-5/8 INCHES AND MARK.
3. SQUARE THE ENDS, CUT AND LAY THEM ASIDE.
4. TAKE TWO 2 x 4's THAT ARE 8 FEET LONG AND LAY THEM SIDE BY SIDE ON THE FLOOR, FLAT SIDE DOWN.
5. MAKE SURE THE ENDS ARE EVEN.



SQUARING A BOARD WITH A FRAMING SQUARE

STEPS:

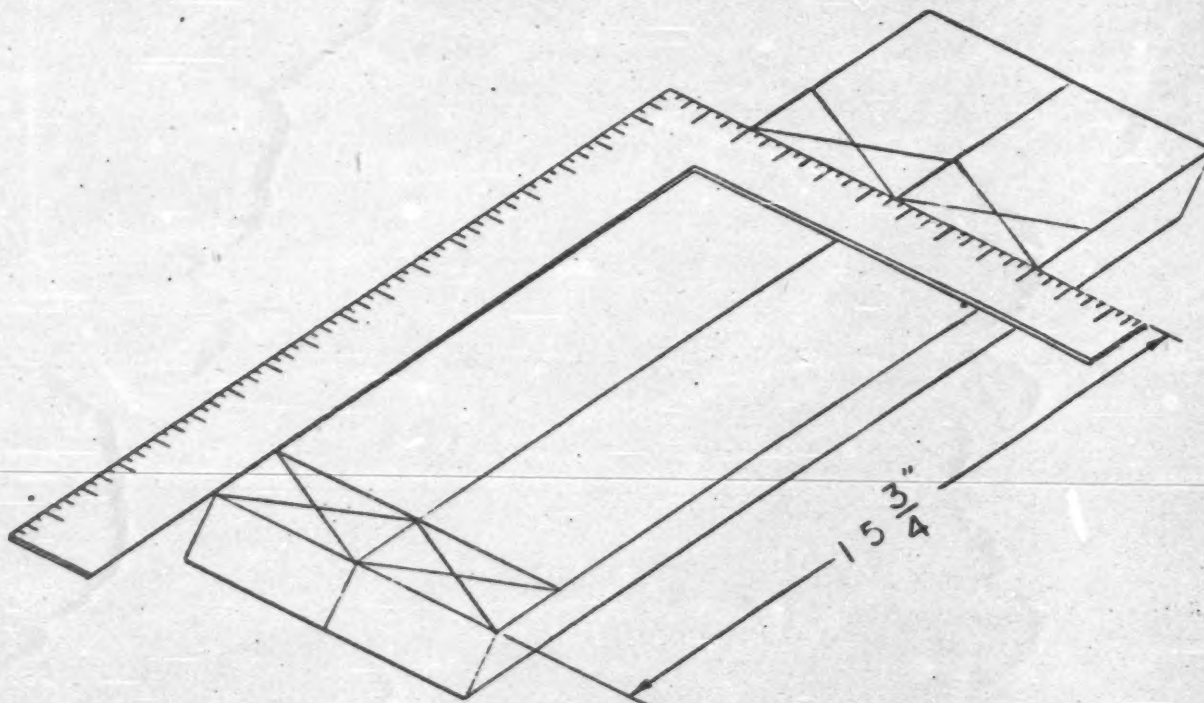
1. HOLD THE BODY (LONG LEG) OF THE FRAMING SQUARE ALONG THE MATERIAL (2 x 4).
2. MAKE SURE IT IS HELD TIGHT AGAINST THE LONG EDGE OF THE 2 x 4.
3. DRAW A LINE ALONG THE TONGUE (SHORT LEG) OF YOUR SQUARE.
4. YOU HAVE NOW MADE A SQUARE LINE AND THIS IS CALLED SQUARING A BOARD.



LAYOUT FOR A FRAMED WALL

LAYOUT OF PLATE AND SHOE

1. TAKE TWO 2x4's THAT MEASURE 8 FEET AND LAY THEM ON THE FLOOR FLAT SIDE DOWN, WITH THE ENDS EVEN. (SEE DRAWING BELOW).
2. MARK AN X AT THE END OF THE 2x4's AS SHOWN BELOW (ON FLAT SIDE).
3. USE YOUR FOLDING RULE TO MEASURE $15 \frac{3}{4}$ INCHES FROM THE END YOU MARKED (WITH X's).
4. USE YOUR FRAMING SQUARE AS SHOWN BELOW TO MAKE A SQUARE LINE.
5. MARK TWO MORE X's NEXT TO THE SQUARE LINE AS SHOWN IN THE DRAWING BELOW.



FRAMING

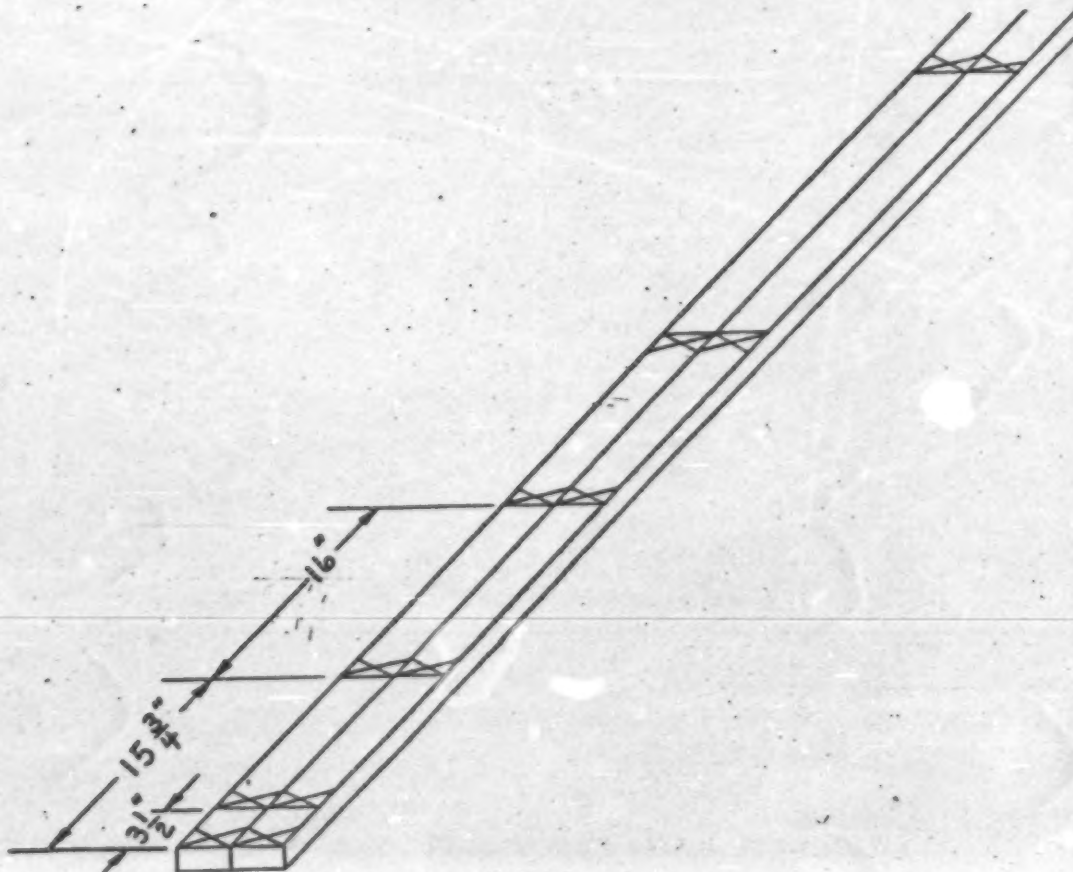
Pg. 11

LAYOUT PLATE AND SHOE

1. LAY OUT REST OF PLATE AND SHOE AS YOU DID ON FIRST SET (PAGE #6).

DO NOT PUT STUD LAYOUT IN DOOR OPENING.

2. AT THE END FROM WHICH YOU STARTED MEASURING, MEASURE $3\frac{1}{2}$ " AND
SQUARE A LINE PUT AN (X). SEE DRAWING BELOW.



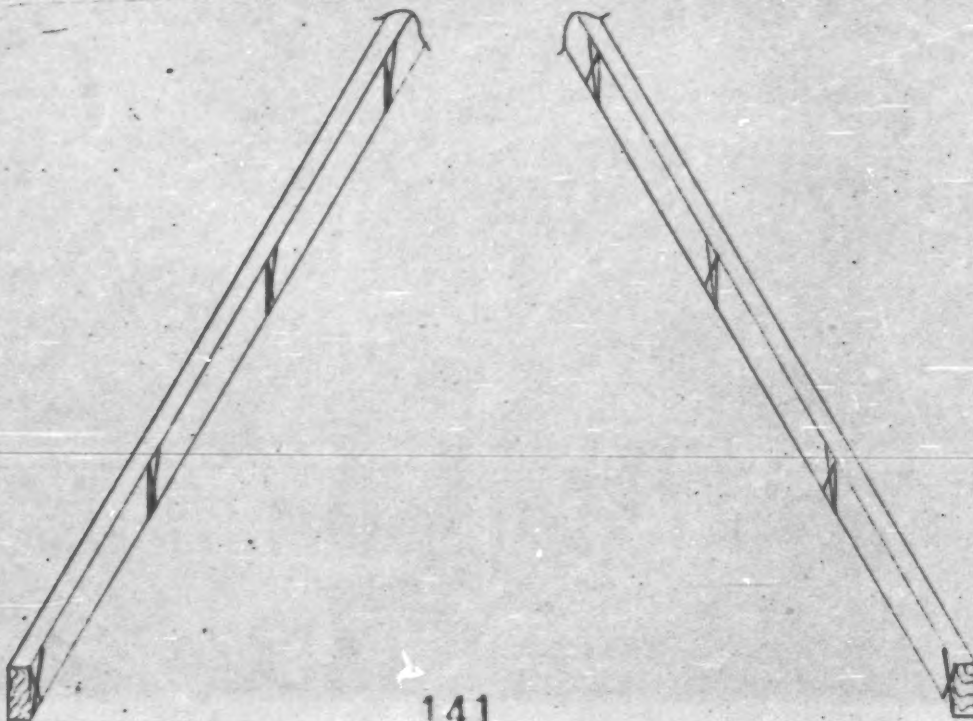
FRAMING

Pg. 12

LAYING OUT

PLATE AND SHOE

1. LAY PLATE AND SHOE ON EDGE WITH X's FACING EACH OTHER. (SEE DRAWING BELOW.)
2. COUNT THE PAIRS OF X's YOU HAVE MADE ON THE PLATE AND THE SHOE.
3. THE NUMBER OF PAIRS OF X's SHOWS HOW MANY 2 x 4's WILL BE NEEDED FOR THE WALL.
4. ON YOUR 8 FT. 2 x 4's MEASURE (7 FT. 8 3/4 IN.) MARK HERE AND SQUARE.
5. CUT THE 2 x 4's USING THE SQUARE LINE AS YOUR GUIDE.
6. THE 2 x 4's YOU HAVE JUST CUT ARE CALLED "STUDS".

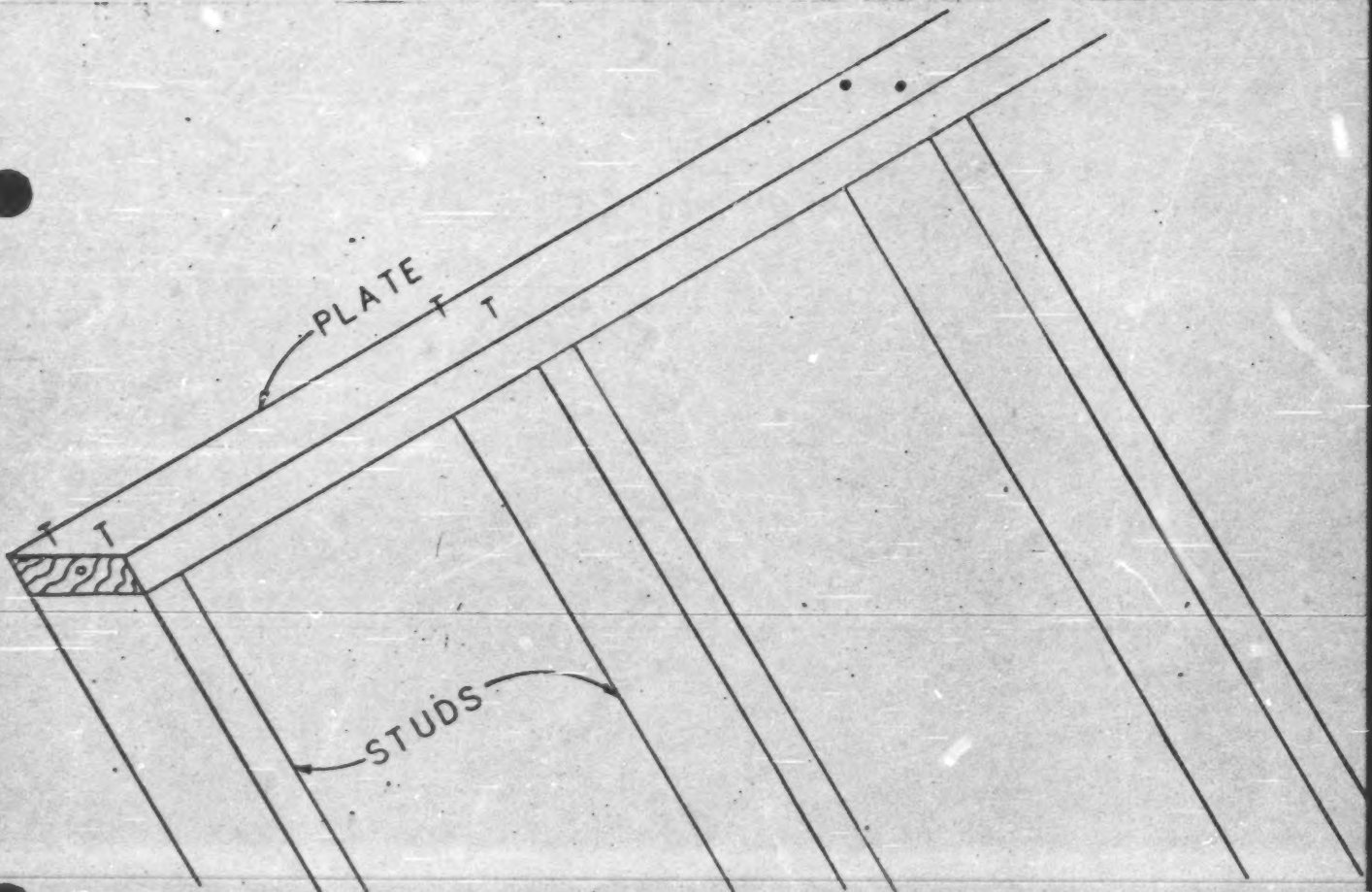


FRAMING

Pg. 13

NAILING STUDS TO PLATE

1. SET ON EDGE THE 2 x 4 THAT IS GOING TO BE THE PLATE.
2. SET ON EDGE THE 2 x 4 STUDS WITH ENDS COVERING THE X MARKS.
3. USING THE SQUARE LINE AS A GUIDE, NAIL TWO 16D COMMON NAILS THROUGH THE PLATE INTO THE END OF THE STUD SHOWN BY THE DRAWING BELOW.



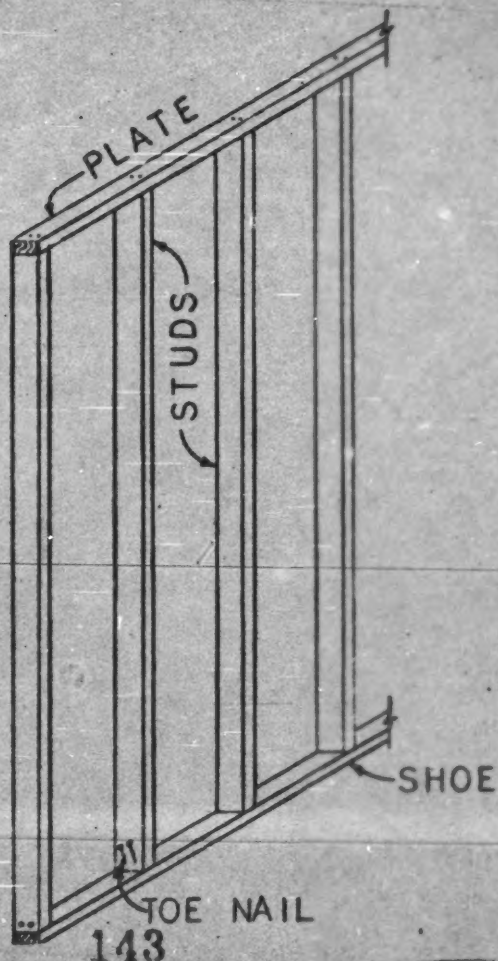
FRAMING

Pg. 14

ERECTING FRAMED WALL

ERECTING (THE INSTRUCTOR SHOULD BE PRESENT TO OBSERVE THIS PROCEDURE.)

1. NAIL THE 2 x 4 THAT IS TO BE THE SHOE TO PLYWOOD FLOOR USING THE OUTER EDGE OF THE FLOOR AS A GUIDE.
2. STAND UP THE 2 x 4 STUD WALL (WHICH HAS ALREADY BEEN NAILED TO PLATE.)
3. WHILE YOUR PARTNER IS STEADYING THE FRAMED WALL, TOE-NAIL (DRIVE NAILS AT AN ANGLE) THE TWO END STUDS TO THE SHOE ON THE "X" SIDE OF THE SQUARE LINE (SEE THE DRAWING BELOW).

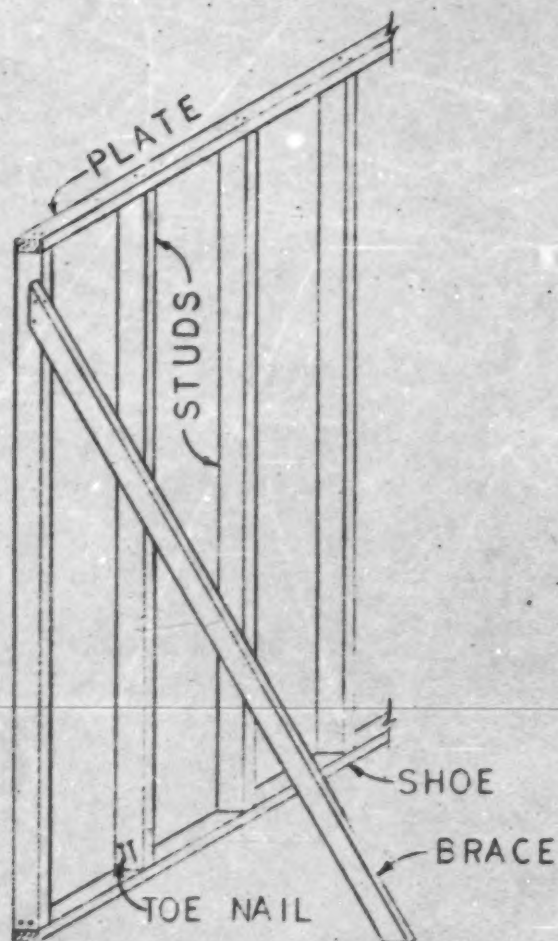


ERECTING FRAMED WALL

Pg. 15

BRACING

1. MAKE SURE BOTH END STUDS ARE TOE NAILED PROPERLY.
2. ERECT AN ANGLE BRACE AT ONE END TO STEADY THE WALL.
3. NAIL THE REMAINING STUDS TO THE SHOE BY TOE NAILING.
4. USE 8D COMMON NAILS. (2 8D COMMON NAILS ON EACH SIDE OF STUD INTO THE SHOE).

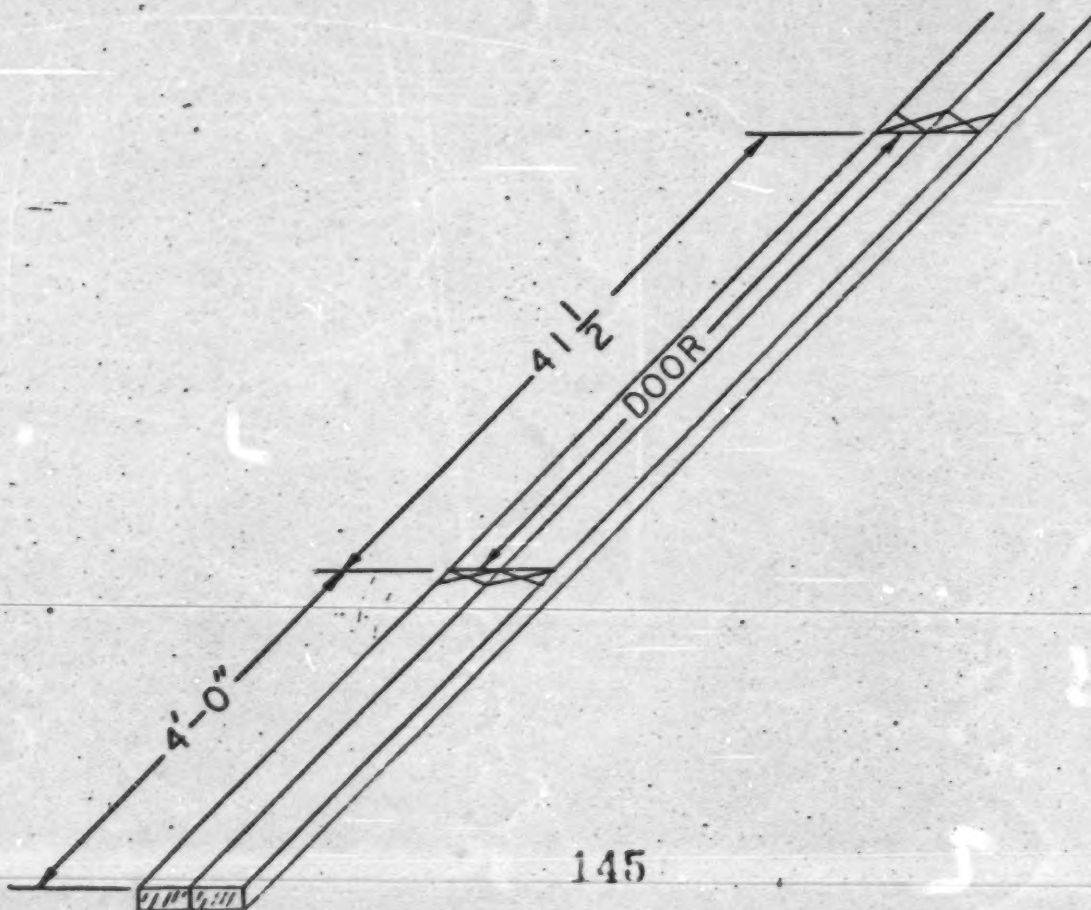


FRAMING

Pg. 16

DOOR LAYOUT

1. TAKE THE PLATE AND SHOE THAT WERE LAID ASIDE.
2. LAY SECOND PLATE AND SHOE ON FLOOR (SAME AS PAGE #6)
3. MEASURE 4'-0" FROM END OF PLATE AND SHOE. SQUARE A LINE. MARK AN (X) BEFORE LINE, AS SHOWN BELOW.
4. MEASURE 4 1/2" FROM THAT LINE AND SQUARE A SECOND LINE. MARK AN (X) AFTER LINE AS SHOWN BELOW.

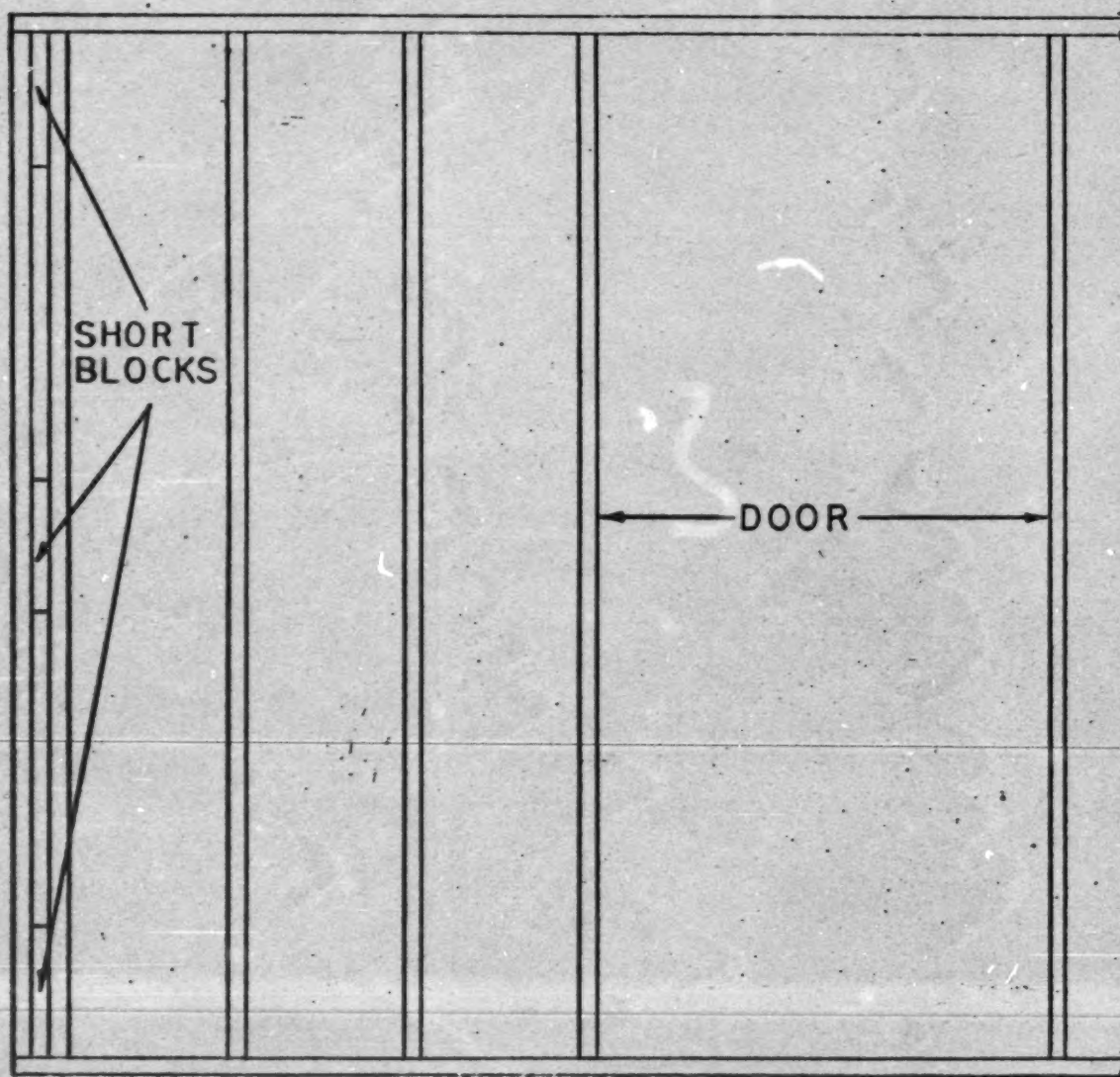


FRAMING

Pg. 17

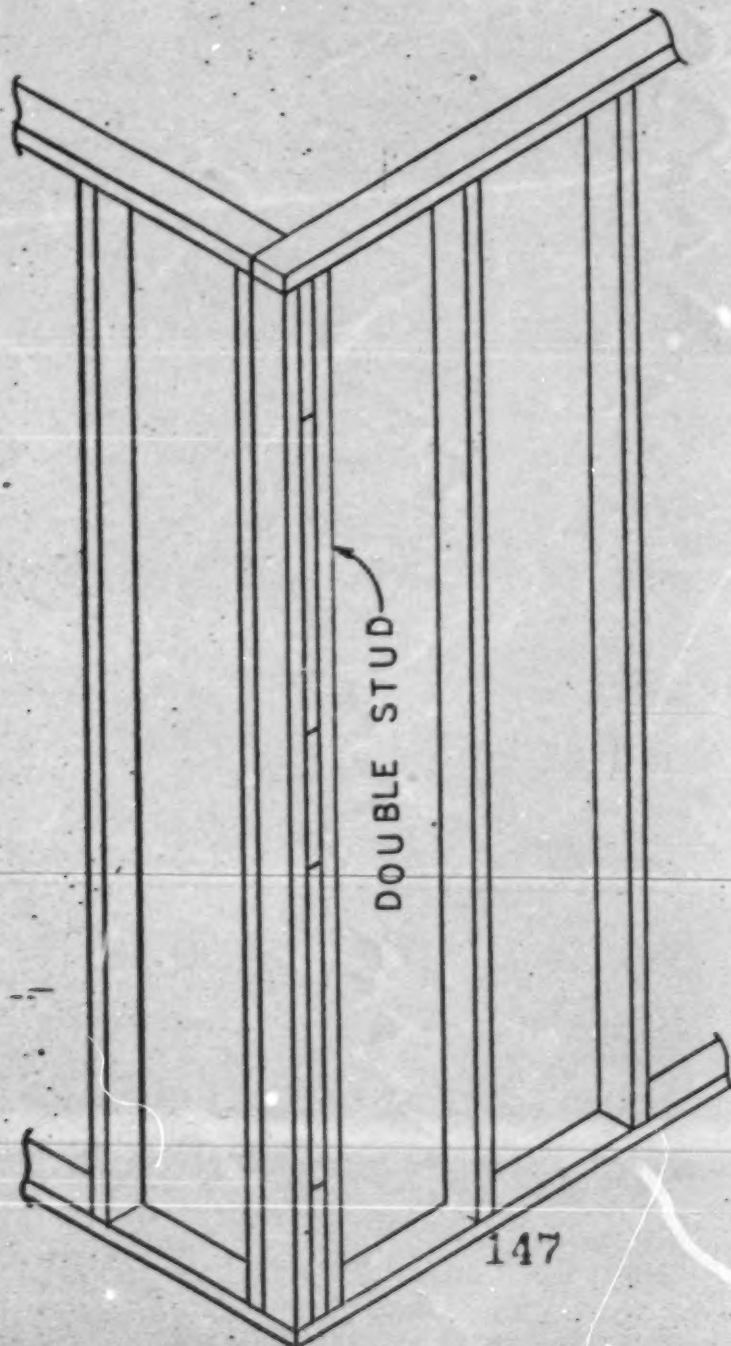
CUTTING AND NAILING STUDS

1. CUT AND NAIL STUDS (SAME AS PAGE #7) TO PLATE.
2. NOW TAKE 3 SHORT BLOCKS (2 x 4's) ABOUT 12" LONG AND NAIL BETWEEN FIRST TWO STUDS. ONE TOP, ONE BOTTOM, AND ONE IN THE MIDDLE.
3. STAND WALL AND TOE NAIL TO SHOE.



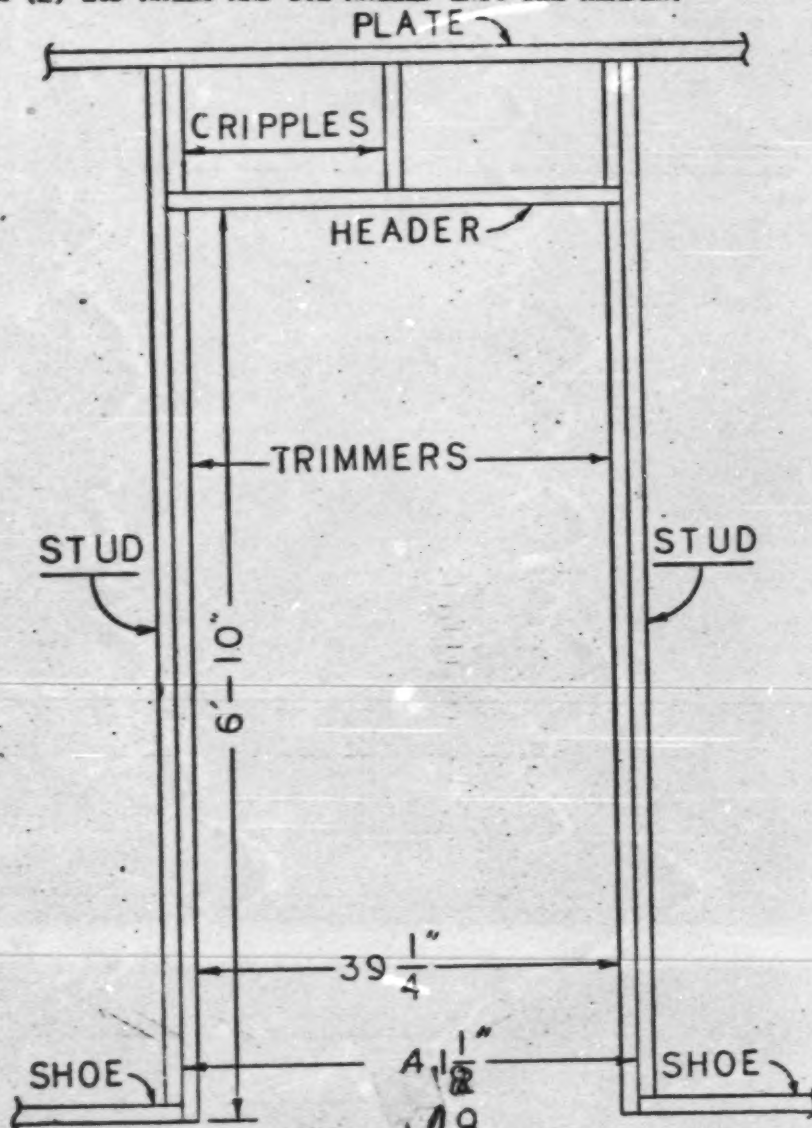
NAILING CORNER

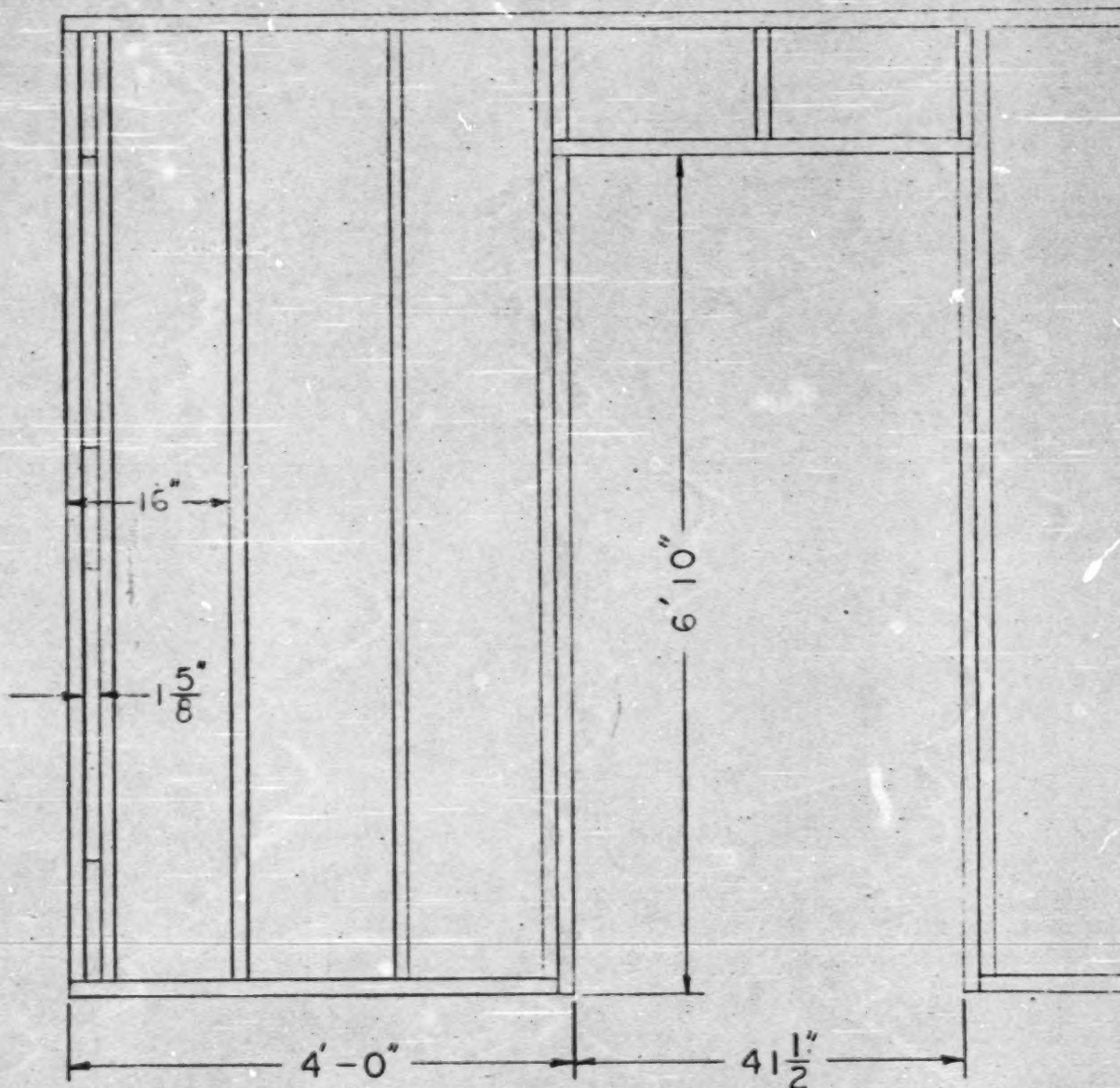
STAND WALL #2 SO THE END WITH THE DOUBLE STUD (WITH SHORT BLOCKS) IS NEXT
TO THE WALL ALREADY STANDING. PLUMB CORNER BOTH WAYS AND NAIL.
(CALL INSTRUCTOR).



DOOR FRAMING

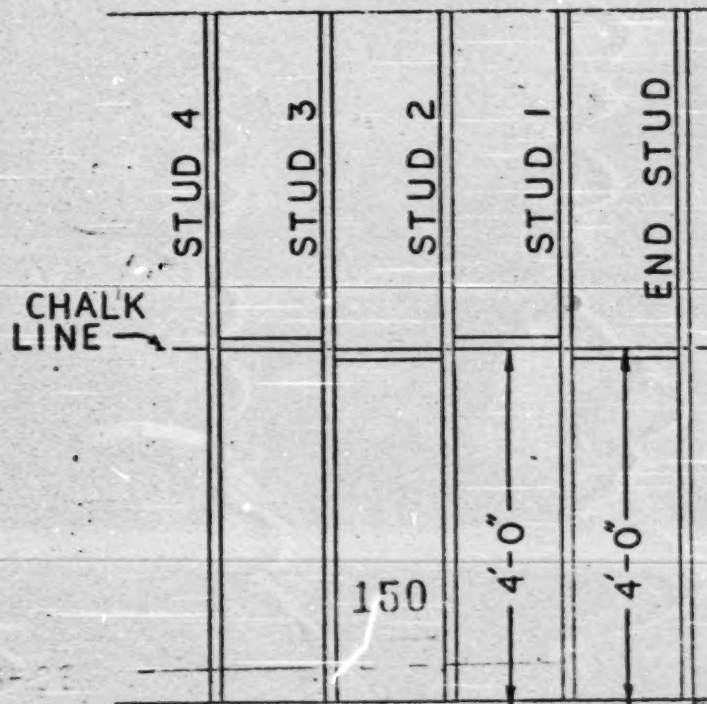
1. CUT (2) 2 x 4's, 6' 10" LONG. THESE ARE CALLED TRIMMERS. STAND ONE ON EACH SIDE OF DOOR FRAME (INSIDE), WITH FLAT SIDE AGAINST STUD. NAIL THESE TO STUDS WITH 16D NAILS.
2. CUT (2) 2 x 4's, 3' 5½" LONG. THESE ARE CALLED HEADERS. LAY THEM ON TOP OF THE TWO TRIMMERS, WIDE SIDE FACING OUT. MAKE SURE THEY ARE FLUSH (EVEN) WITH THE STUD. (THIS WILL LEAVE A SMALL SPACE BETWEEN THEM. NAIL THROUGH THE STUDS INTO THE HEADER (16D NAILS).
3. MEASURE FROM THE TOP OF THE HEADER TO THE BOTTOM OF THE PLATE. CUT (3) 2 x 4's THIS LENGTH. THESE 2 x 4's ARE CALLED CRIPPLES. NAIL (16D NAILS) THE CRIPPLES AS SHOWN IN FIGURE BELOW. NAIL (16D NAILS) THE OUTSIDE ONES INTO THE STUDS. THE CENTER ONE IS NAILED DOWN THROUGH THE PLATE WITH (2) 16D NAILS AND TOE NAILED INTO THE HEADER.





FIRE BLOCKING

1. MEASURE UP 4'0" FROM FLOOR ON EACH END STUD AND MARK.
2. DRIVE NAIL INTO ONE STUD EXACTLY ON LINE.
3. TIE CHALKED STRING (FROM CHALK BOX) TO 6D NAIL.
4. PULL STRING TIGHT AND HOLD SECURELY AGAINST LINE ON THE SECOND END STUD.
5. SNAP LINE AGAINST STUDS. (THIS WILL LEAVE A CHALK MARK ON EACH STUD 4'0" FROM THE FLOOR.)
6. MEASURE BETWEEN END STUD AND STUD #1. CUT 2 x 4 TO FIT HERE. (SEE DRAWING BELOW).
7. PLACE THE CUT 2 x 4 BETWEEN END STUD AND STUD #1 WITH TOP OF WIDE PART EXACTLY EVEN WITH CHALK MARK ON EACH STUD.
8. NAIL THROUGH EACH STUD (2 - 16D NAILS) INTO EACH END OF 2 x 4.
9. REPEAT STEP 6 FOR STUDS #1 AND #2.
10. REPEAT STEP 7, EXCEPT PLACE BOTTOM OF 2 x 4 BLOCK EVEN WITH CHALK MARK. THIS WILL MAKE ONE BLOCK UP AND ONE DOWN. (SEE DRAWING BELOW.)
11. CONTINUE THIS UNTIL THE OTHER END STUD IS SECURE.
12. THESE BLOCK (BETWEEN STUDS) ARE "FIRE BLOCKS."



TEACHER'S BLOCK-UNIT LESSON PLAN

PRE-TEST: NONE

PRE-REQUISITES: NONE

STUDENT OBJECTIVES:

SAME AS STUDENT'S PACKAGE

REASONS FOR OBJECTIVES:

SAME AS STUDENT'S PACKAGE

LEARNING ACTIVITIES:

IN THE FOLLOWING PACKAGE THE STUDENT'S KNOWLEDGE AND SKILLS OF ROOF FRAMING SHOULD BE INCREASED. THE PACKAGE COVERS CHOOSING MATERIALS, MEASURING, LAYING OUT, CUTTING, PITCHING AND ASSEMBLY OF A COMMON 6' x 12' ROOF. HANDOUTS OF ROOF STYLES AND PARTS ARE AN IMPORTANT PART OF THIS PACKAGE AND SHOULD BE COVERED THOROUGHLY BY INSTRUCTOR.

THE INSTRUCTOR WILL:

A. GIVE HANDOUTS TO STUDENTS AND GO OVER AND EXPLAIN EACH HANDOUT.

1. TYPES OF ROOFS

- a. SHED
- b. GABLE
- c. FLAT
- d. HIP
- e. GAMBLE
- f. L-SHAPED
- g. CONTINUOUS SLOPE
- h. BUTTERFLY

2. FRAMING SQUARE

- a. TABLES
 - (1) RAFTER
 - (2) VALLEY AND HIP
 - (3) JACK
 - (4) SIDE CUT

TEACHER'S BLOCK-UNIT LESSON PLAN (CONT'D)

- b. MEASUREMENTS
 - (1) SINGLE SQUARE
 - (2) DOUBLE SQUARE
- 3. ROOF PARTS
 - a. COMMON
 - b. JACK
 - c. HIP
 - d. VALLEY
- 4. PITCH
 - a. 6 x 12
 - b. 12 x 12
 - c. 6 x 15
 - d. 12 x 15
- 5. TRUSS
 - a. TYPES
 - b. CONSTRUCTION

B. SHOW STUDENT'S HOW TO USE THE SQUARE FOR FINDING AND LAYING OUT PITCH (PROJECT).

C. GIVE STUDENT'S ADDITIONAL HELP WHEN NEEDED ON FRAMING OF ROOF (PROJECT).

EVALUATION:

- THE STUDENT SHOULD BE CONSTANTLY EVALUATED THROUGHOUT THE PROJECT. USE THE ATTACHED EVALUATION SHEET TO EVALUATE THE STUDENT'S WORK AND MANIPULATIVE SKILLS. A WRITTEN TEST ON MATERIALS, TYPES OF ROOFS AND TOOLS WILL BE GIVEN AT THE END OF THE PACKAGE.

ROOF FRAMING

Pg. 24

STUDENT'S NAME _____
(LAST) (FIRST)

CLASS/SECTION _____ STARTED: TIME: _____ DATE _____

TARGET COMPLETION TIME: _____

COMPLETED TIME: _____ DATE _____

PRE-TEST: NONE

STUDENT OBJECTIVES:

THE STUDENT WILL BE ABLE TO:

1. LAYOUT CUT AND FIT RAFTERS.
2. DEFINE "PITCH" ORALLY.
3. NAME THE PARTS OF A ROOF ON A WRITTEN TEST.
4. NAME THE TYPES OF ROOFS ON A WRITTEN TEST.

REASON FOR OBJECTIVES:

1. TO ASSIST THE STUDENT IN LEARNING ROOF FRAMING.
2. TO IMPROVE THE STUDENT'S SKILLS WITH HAND TOOLS.
3. TO INCREASE THE STUDENT'S KNOWLEDGE OF ROOF STYLES.

LEARNING ACTIVITIES:

1. WHEN GIVEN A PLAN, LAYOUT A RAFTER USING PROPER PROCEDURES TO OBTAIN CORRECT PITCH.
2. WHEN GIVEN A PLAN, CORRECTLY CUT AND FIT A RAFTER USING PROPER TOOLS AND PROCEDURES.
3. DEFINE "PITCH" ORALLY.
4. OBTAIN A MINIMUM SCORE OF 70% CORRECT ON A WRITTEN TEST COVERING THE ROOF AND ROOF PARTS.
5. FROM A GROUP OF TEN ROOF STYLES, CORRECTLY IDENTIFY AND NAME FIVE.

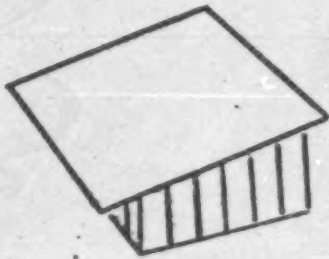
EVALUATION:

THE STUDENT WILL BE CONSTANTLY EVALUATED THROUGHOUT THE COURSE ON MANIPULATIVE SKILLS BY THE INSTRUCTOR. A WRITTEN TEST WILL BE GIVEN AT THE END OF THIS PACKAGE COVERING, PARTS, MATERIALS, TOOLS, TYPES AND PROCEDURES IN FRAMING A ROOF.

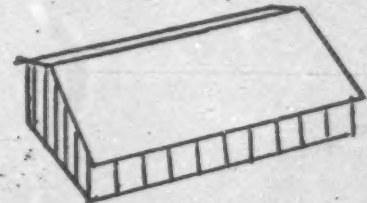
ROOF FRAMING

Pg. 25

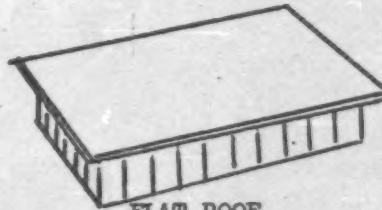
HANDOUT #1



SHED ROOF



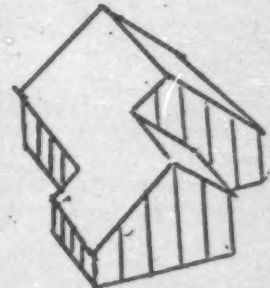
GABLE ROOF



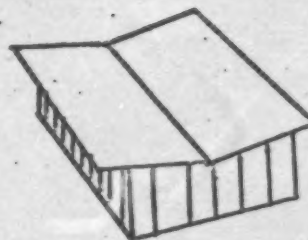
FLAT ROOF



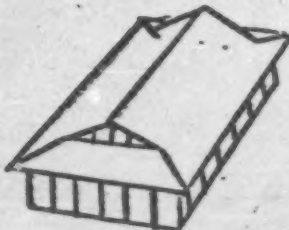
HIP ROOF



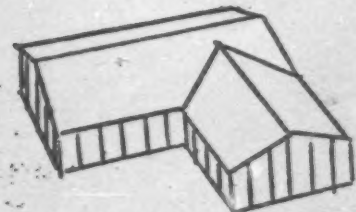
CONTINUOUS
SLOPE GABLE



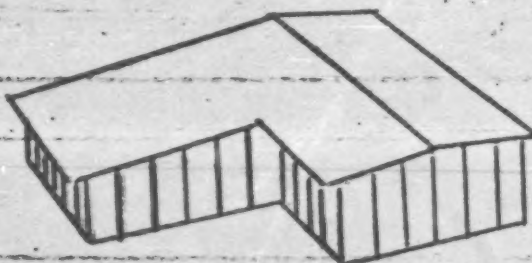
BUTTERFLY ROOF



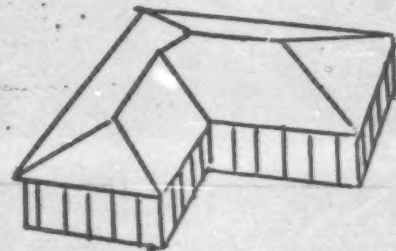
"DUTCH" HIP ROOF



L-SHAPED GABLE ROOF

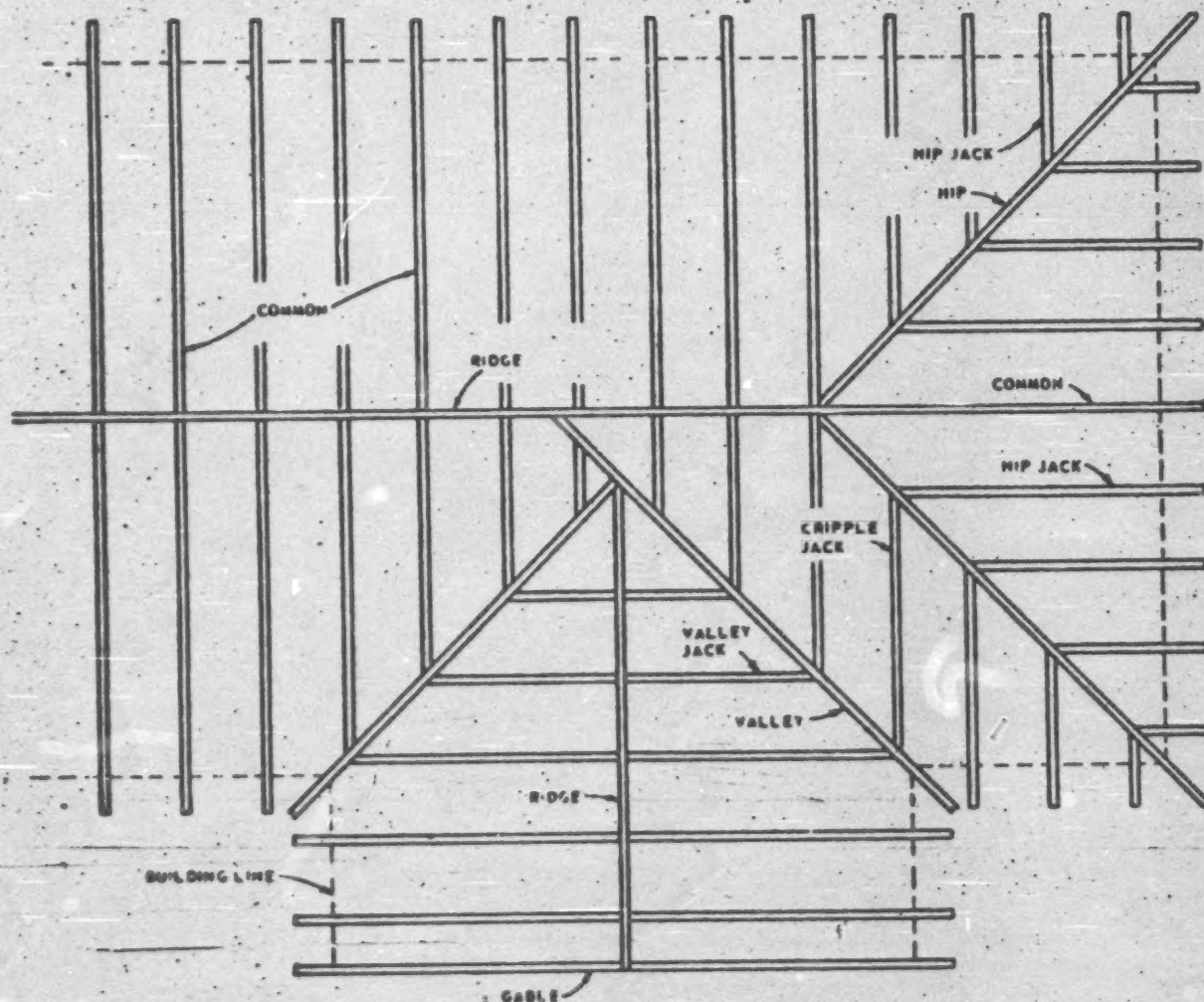


CONTINUOUS LOW SLOPE GABLE ROOF



L-SHAPED HIP ROOF

HANDOUT #3

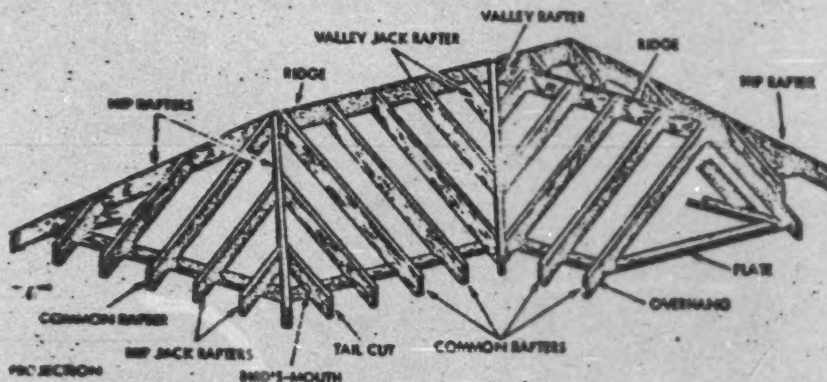


Plan view of roof frame, showing ridges and various kinds of rafters.

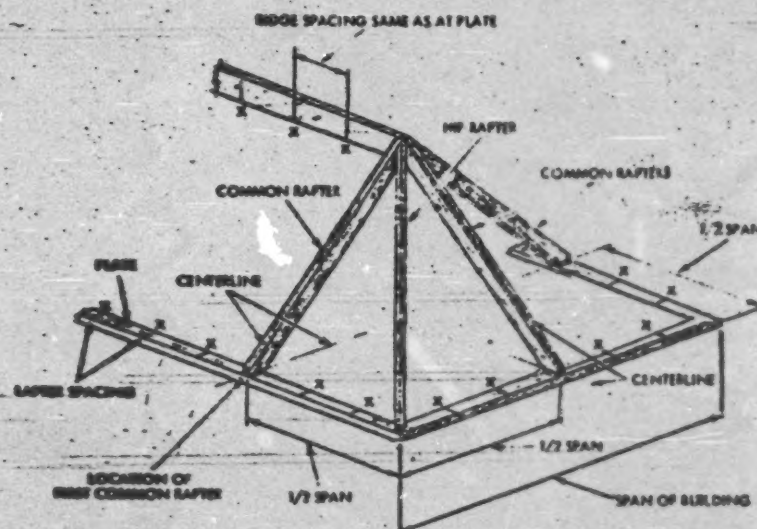
ROOF FRAMING

Pg. 28

HANDOUT #4



The names of the members of a roof are important. (Note that the projection is a level dimension, while the overhang follows the rafter line.)

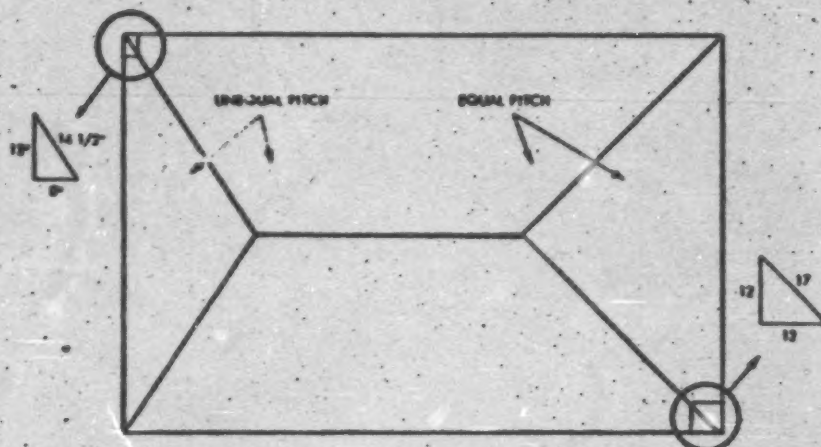


The erection of a hip roof begins with common rafters and ridge. (The rafter spacing is not to scale.)

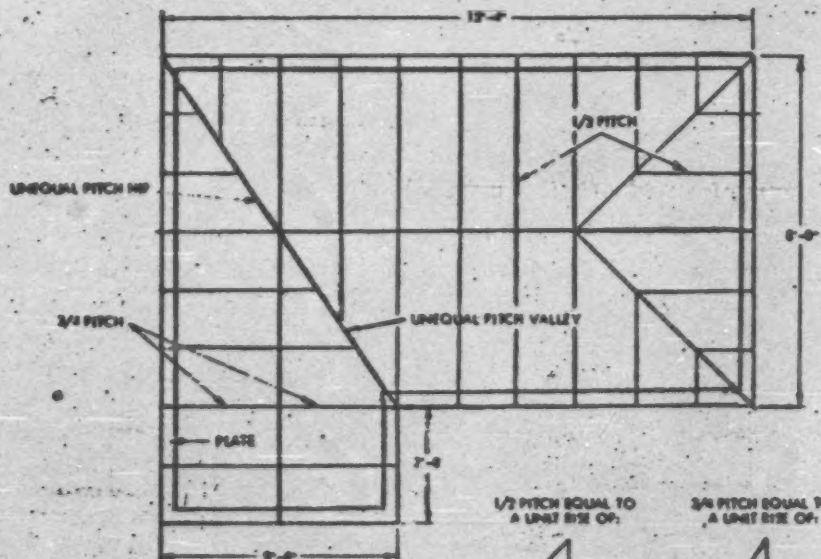
ROOF FRAMING

Pg. 29

HANDOUT #5



.. The unit run of an unequal pitch rafter is not 17, because it is the diagonal of a rectangle instead of a square.



1/2 PITCH EQUAL TO
A UNIT RISE OF:



3/4 PITCH EQUAL TO
A UNIT RISE OF:

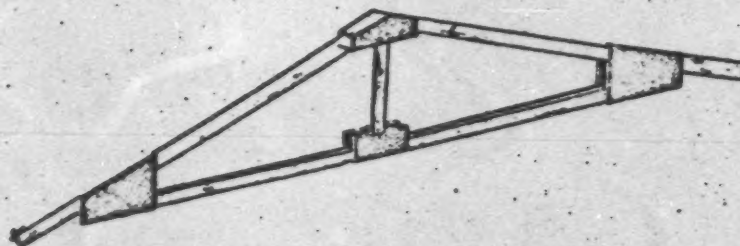


.. The plan of a roof with an unequal portion should be laid out to scale in order to find the location and run of rafters.

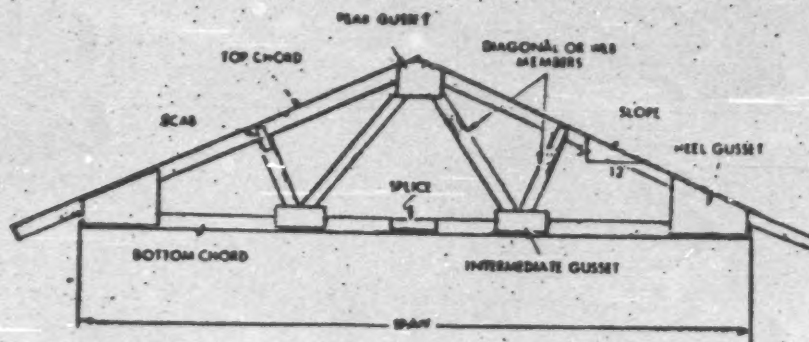
ROOF FRAMING

Pg. 30

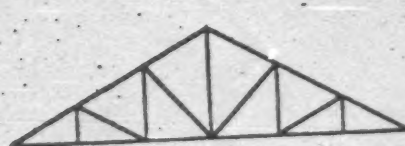
HANDOUT #6



The king post trussed rafter is a small truss with plywood gusset plates nailed and glued in place.



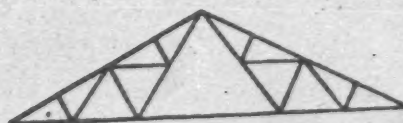
The carpenter should know the name of the parts of a truss.



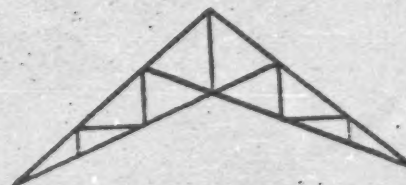
PITCHED HOWE



PITCHED PRATT



FINK



SCISSORS



WARREN



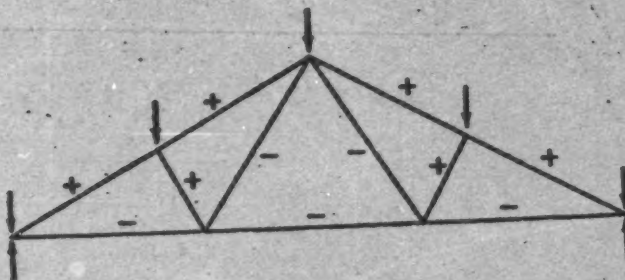
BOWSTRING

Many trusses using these shapes are made up and

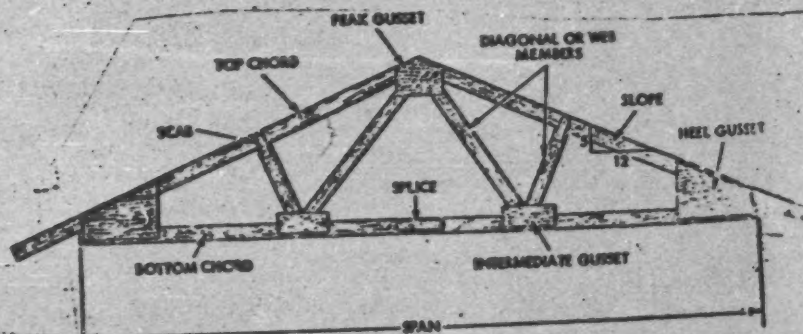
ROOF FRAMING

Fig. 31

HANDOUT #7



The load on a truss is considered to be concentrated at panel points. Some members are in tension (-) and some in compression (+).

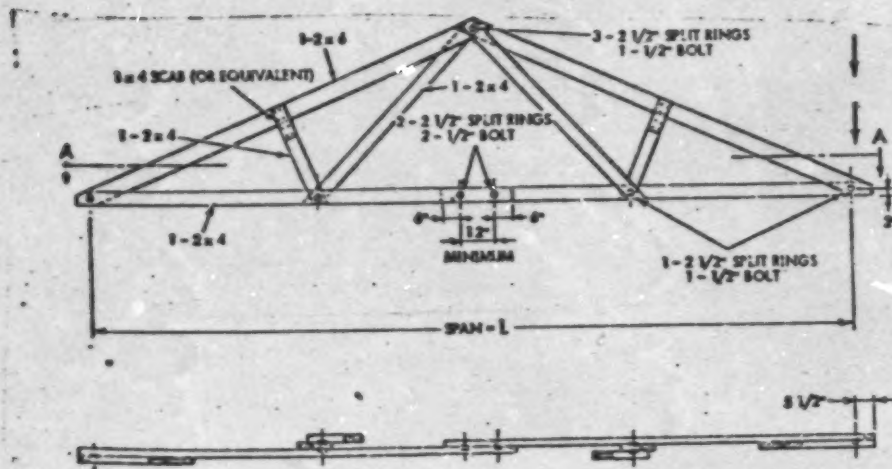


The carpenter should know the names of the parts of a truss.

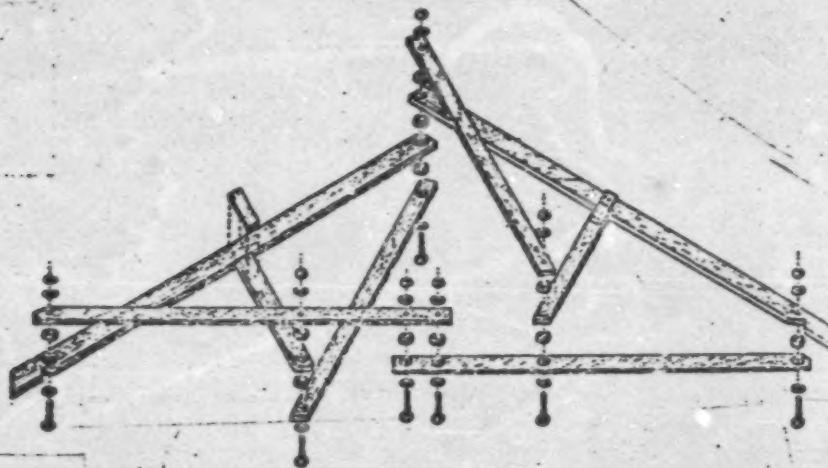
ROOF FRAMING

Pg. 32

HANDOUT #8



Split ring connectors are used in the assembly of the truss.



Trusses are assembled using split rings. (Timber Engineering Co.)



MATERIAL LIST

MATERIAL	SIZE	TYPE	QUANTITY
2 x 4	8'-0"		5
NAILS	8D	COMMON	
NAILS	6D	FINISH	
1 x 6	10'-0"		2

TOOL LIST

MATERIAL	SIZE	TYPE	QUANTITY
HAMMER		16 oz.	1
SQUARE		FRAMING	1
RULE	6 ft.		1
SAW		CROSSCUT	1
SAW		RIP	1
PENCIL		CARPENTER	1
	162		

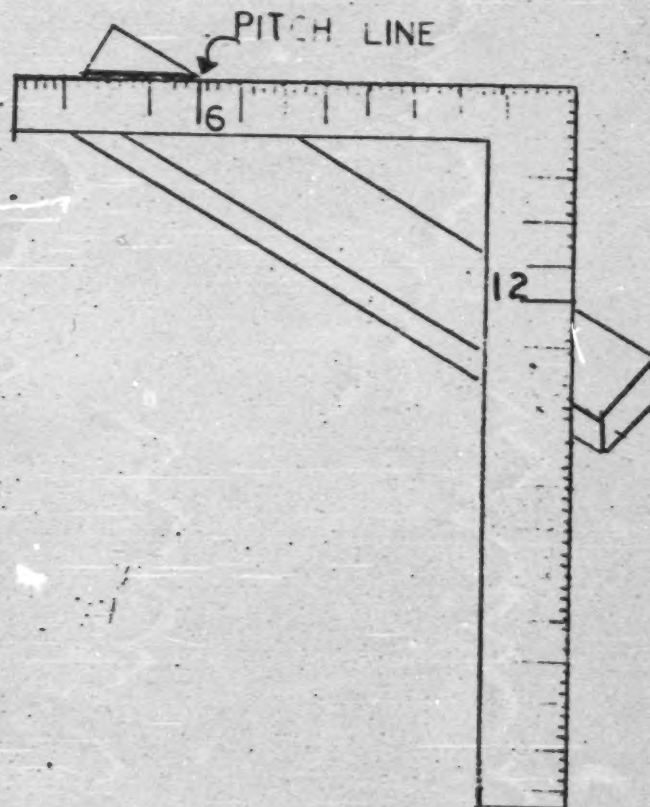
ROOF FRAMING

Pg. 34

LAYING OUT PITCH

CUT 4pc. 2 x 4 - 8 FT. LONG INTO 8 - 2 x 4 - 4 FT. LONG

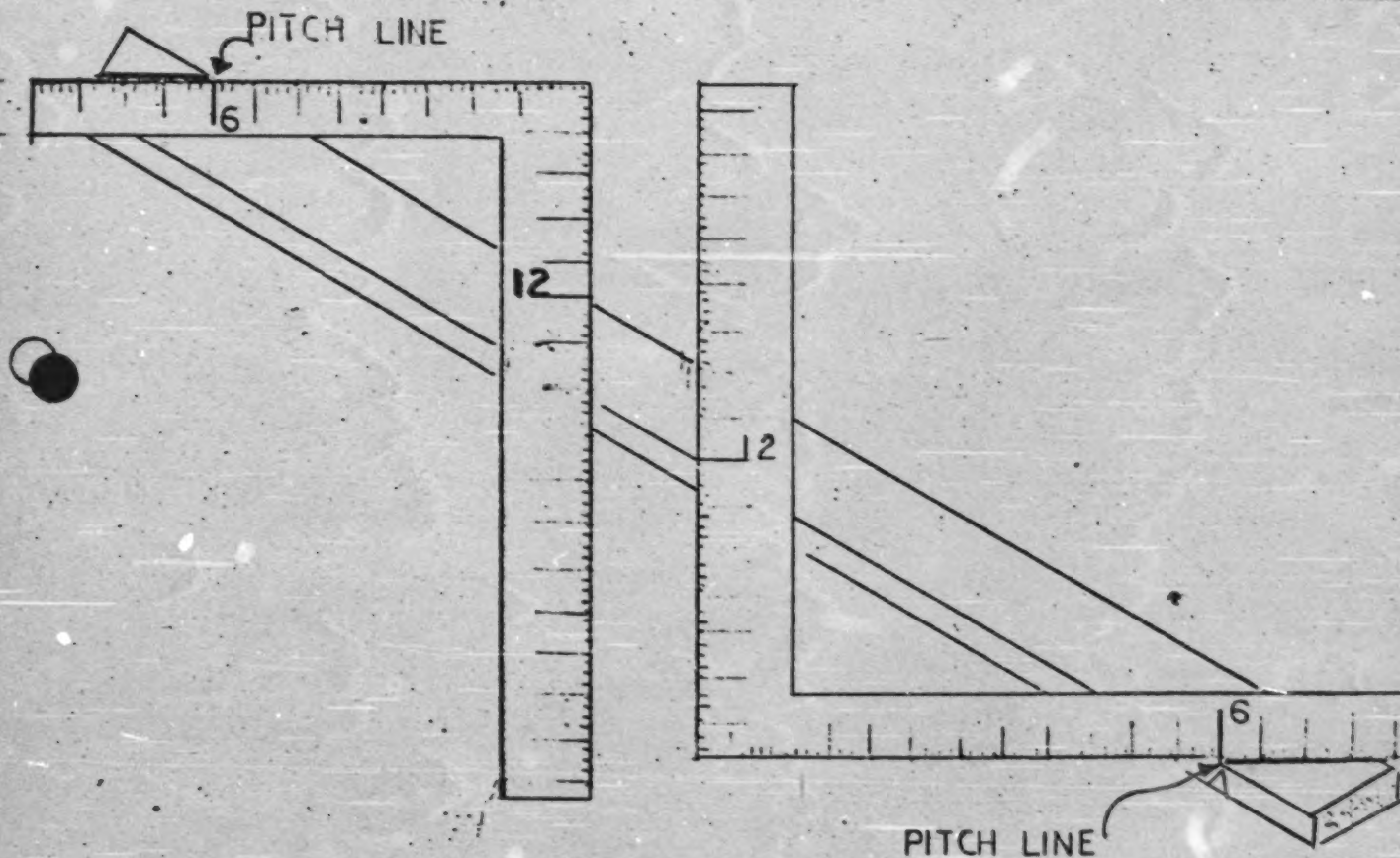
HOLD SQUARE SO THE "6" ON THE SHORT LEG IS EVEN WITH THE TOP EDGE OF THE 2 x 4 AND CLOSE TO ITS END. PUT THE "12" ON THE LONG LEG OF YOUR SQUARE EVEN WITH THE TOP EDGE OF THE 2 x 4, STRIKE A LINE ALONG THE SHORT SIDE OF THE SQUARE (THE SIDE WITH THE 6). THE LINE YOU HAVE JUST DRAWN IS CALLED PITCH.



REVERSE PITCH

TURN YOUR SQUARE OVER AND REPEAT STEP #2 ON THE OTHER END OF THE 2 x 4.

NOW CUT OFF EACH END WITH YOUR HAND SAW ON YOUR PITCH LINES.

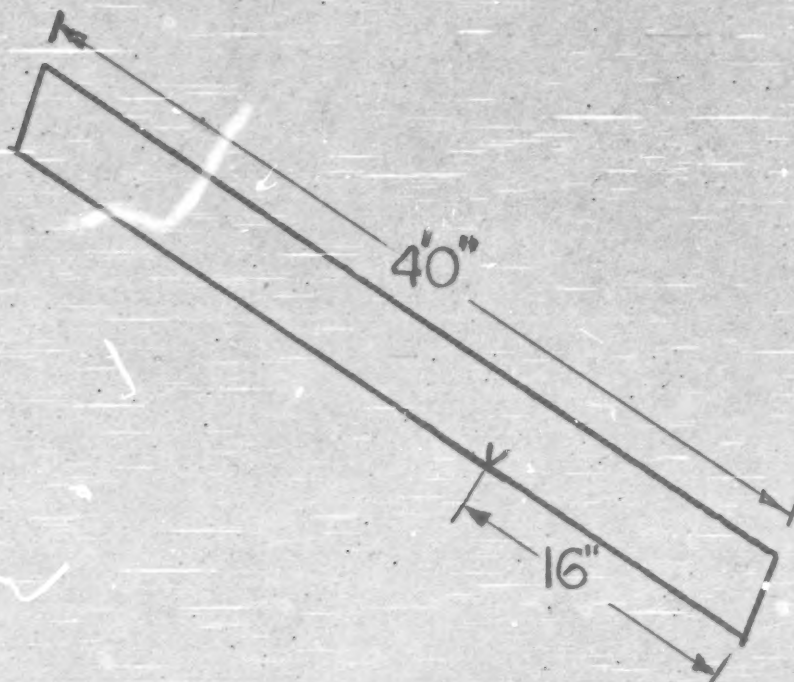


ROOF FRAMING

Pg. 36

LAYING OUT BIRD'S MOUTH

MEASURE 16" FROM THE LONG END OF ONE OF THE "PITCH LINES" ALONG THE 2 x 4 -
2nd MARK.

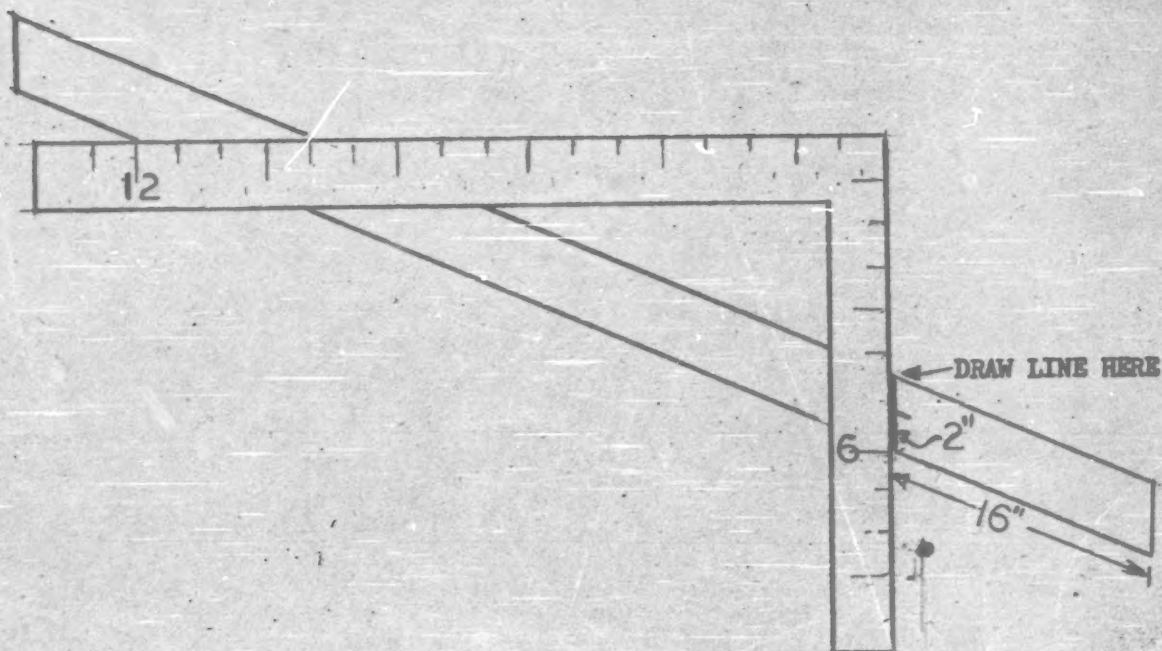


LAYING OUT BIRD'S MOUTH

HOLD THE #6 (ON SHORT LEG OF SQUARE) AND #12 (ON LONG LEG) AGAINST THE BOTTOM SIDE OF THE 2 x 4, WITH THE #6 AT THE MARK JUST MADE. DRAW A LINE ALONG THE SHORT LEG AS SHOWN IN DRAWING BELOW.

ON THE LINE YOU DREW, MEASURE UP 2" AND PUT SMALL MARK.

(SEE DRAWING BELOW)



ROOF FRAMING

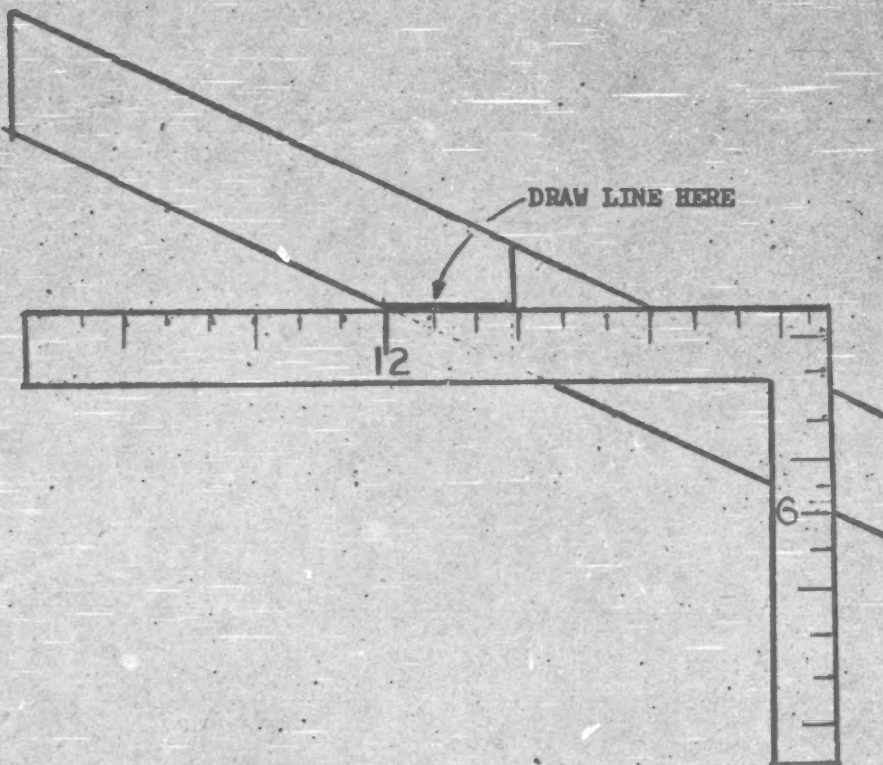
Pg. 38

LAYING OUT BIRD'S MOUTH

HOLD THE SQUARE ON #6 AND #12 AS BEFORE. SLIDE THE SQUARE ALONG THE 2 x 4 UNTIL THE #12 SIDE (LONG LEG) REACHES THE POINT ON THE LINE WHERE THE 2" MARK WAS MADE IN THE LAST STEP.

DRAW A LINE ON THE 2 x 4 ALONG THE #12 SIDE OF YOUR SQUARE.

(SEE DRAWING)

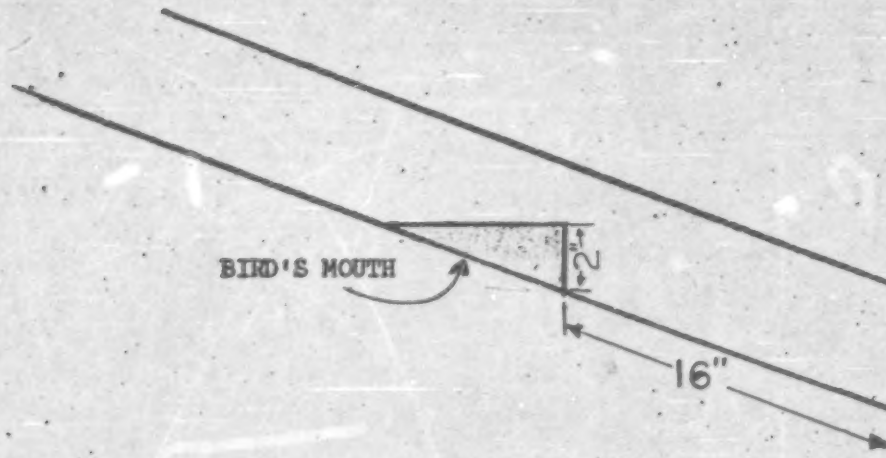


ROOF FRAMING

Pg. 39

LAYING OUT BIRD'S MOUTH

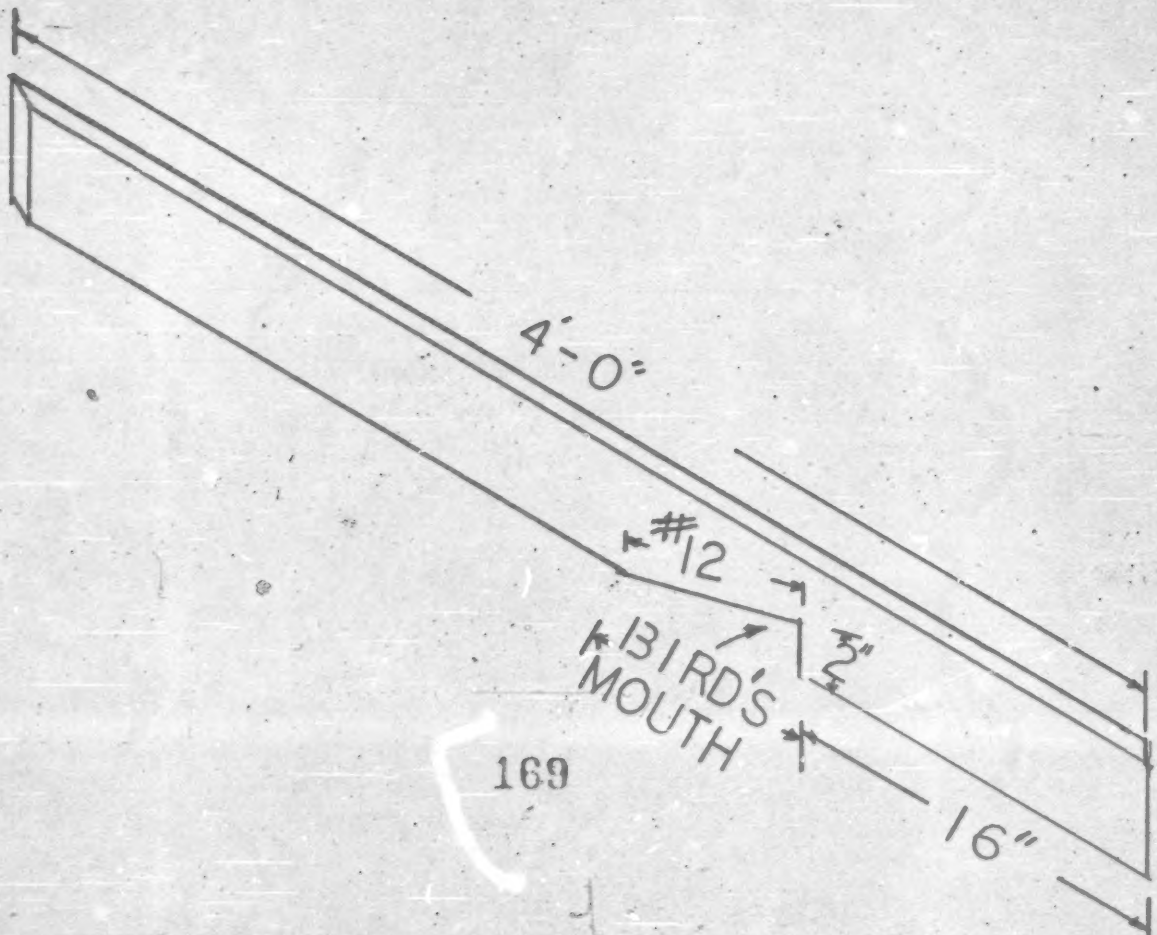
YOU HAVE NOW MARKED A FIGURE CALLED A BIRD'S MOUTH.



CUTTING OUT BIRD'S MOUTH

NOW CUT OUT THE BIRD'S MOUTH WITH YOUR HAND SAW.

CUT ALONG THE 2" LINE, WITH CROSS CUT SAW, CUT ALONG THE #12 LINE WITH
RIPSAW.

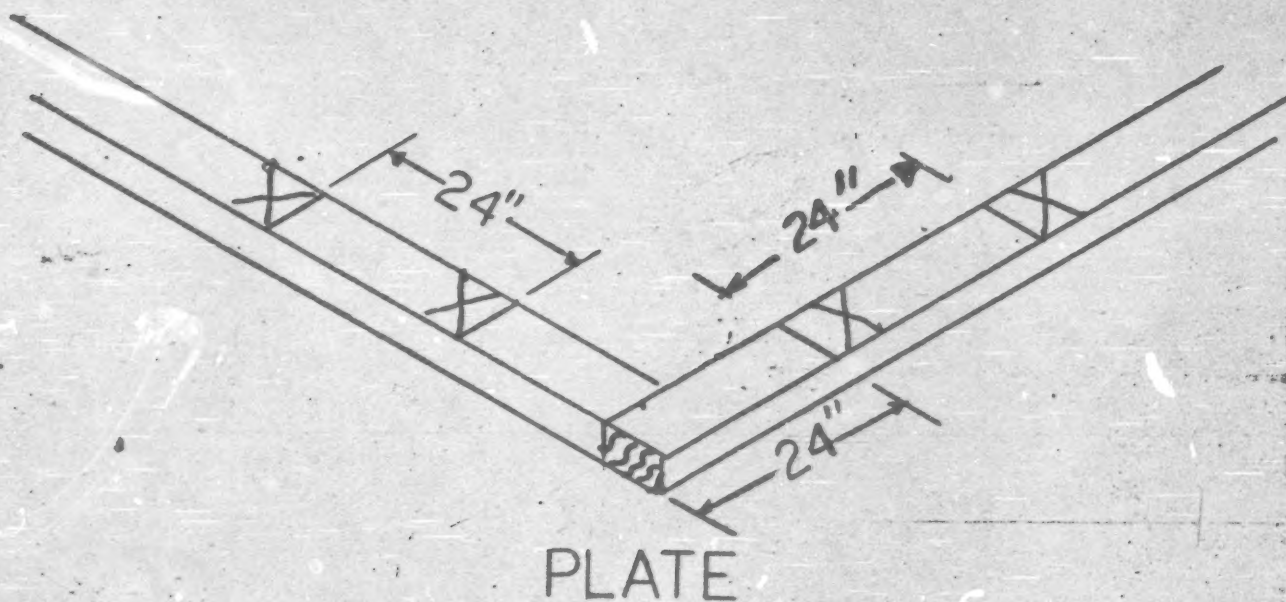


ROOF FRAMING

Pg. 41

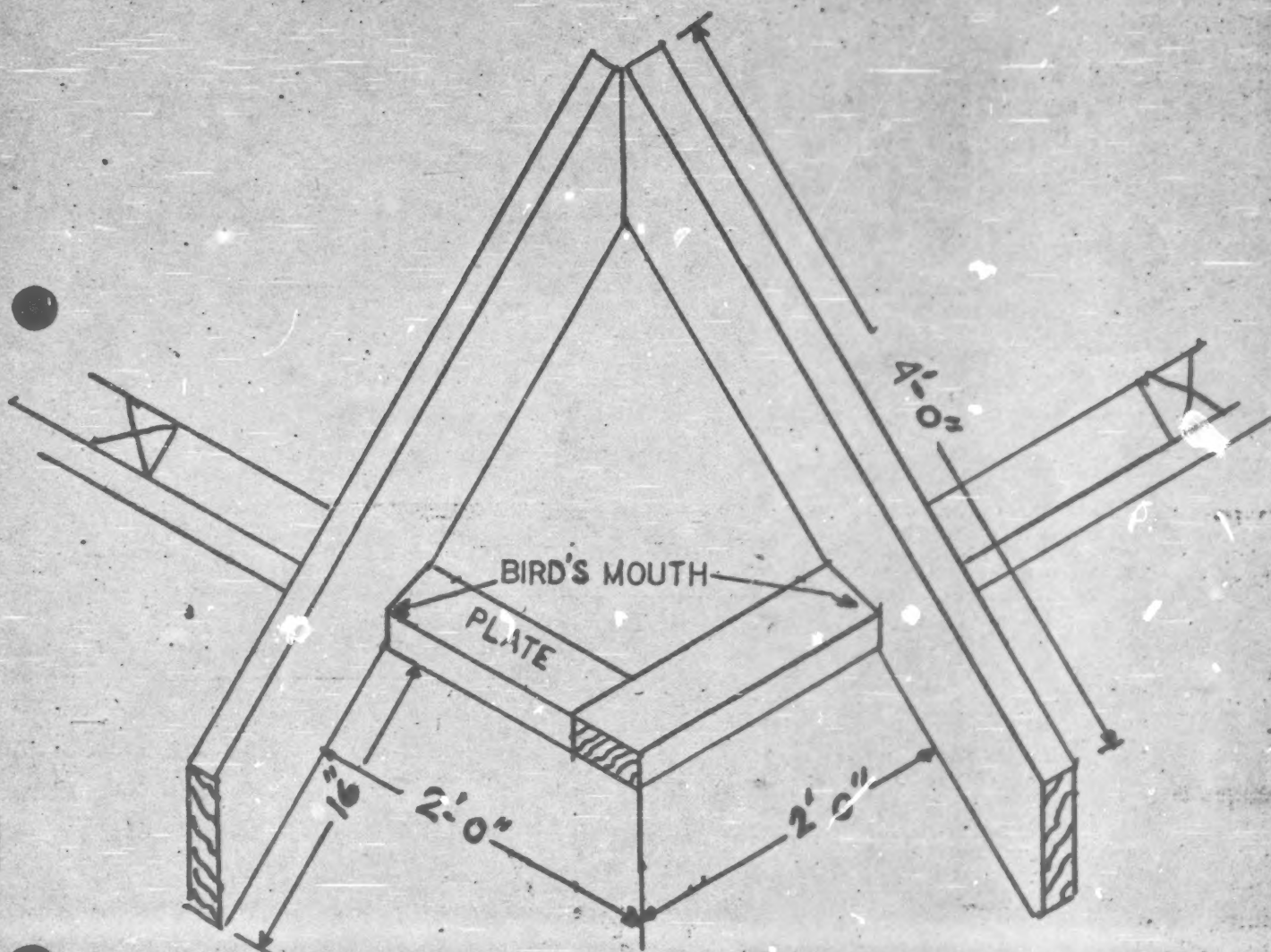
RAFTER LAYOUT

1. USING THE RAFTER YOU HAVE JUST MADE AS A PATTERN, LAYOUT 8 MORE RAFTERS.
2. ON THE TOP OF THE PLATE, MEASURE FROM ONE CORNER 24" AND SQUARE A LINE.
3. PUT AN "X" JUST AFTER THE LINE.
4. FROM THIS LINE MEASURE ANOTHER 24" AND STRIKE A SECOND LINE AND MARK AN "X".
5. REPEAT UNTIL END OF THE PLATE.
6. REPEAT THE RAFTER LAYOUT PROCEDURES ON SECOND PLATE.



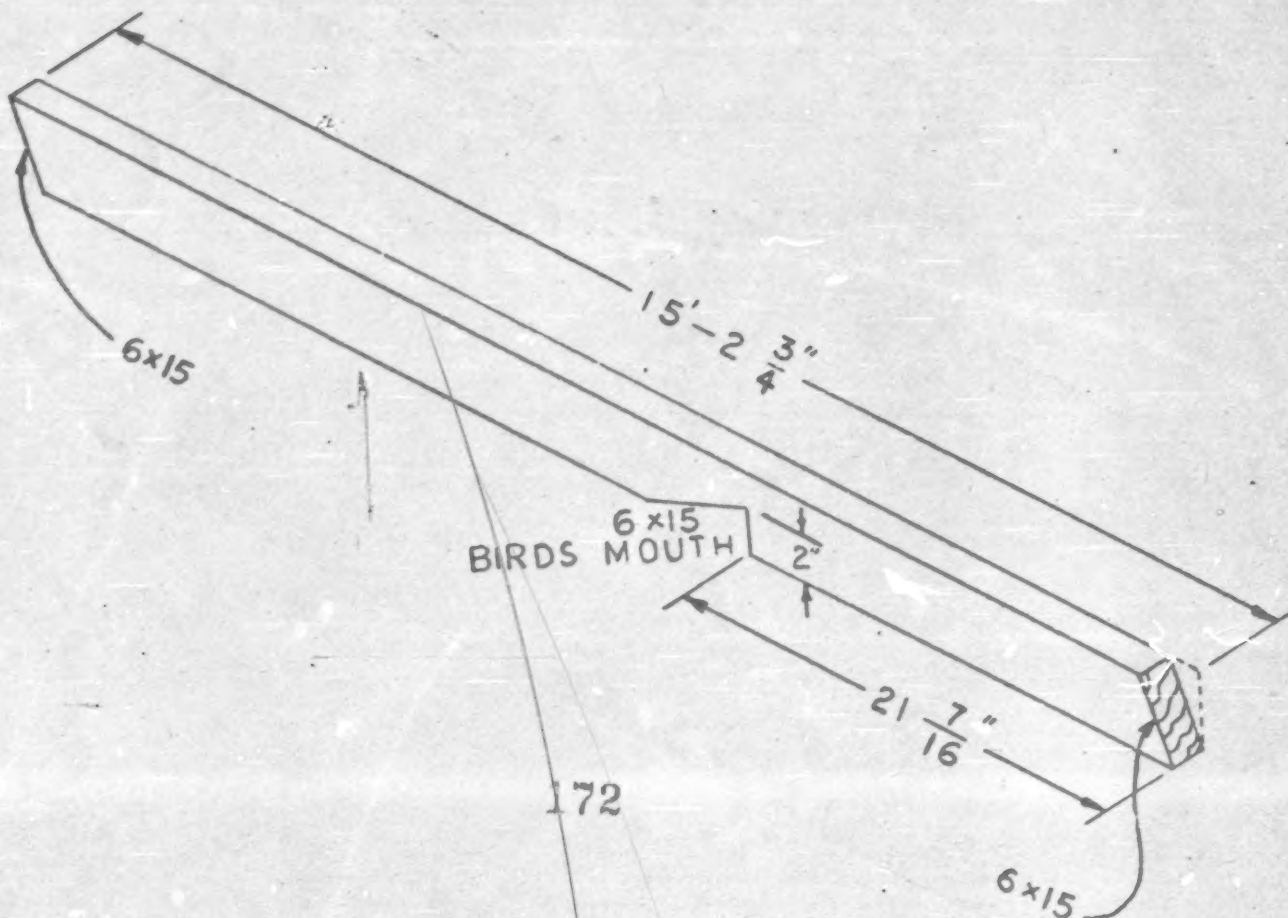
SETTING AND NAILING RAFTERS

1. SET A RAFTER ON TOP OF PLATE, (ON THE "X" SIDE OF SQUARED LINE) SO THE BIRD'S MOUTH COVERS THE "X". (AS SHOWN BELOW)
2. TOENAIL RAFTER TO THE PLATE USING 8D NAILS.
3. SET AND NAIL REST OF THE RAFTERS IN PLACE.



LAYING OUT AND CUTTING OF HIP

1. CUT A 2 x 4, 5'-2-3/4" LONG.
2. LAYOUT A 6 x 15 PITCH ON EACH END OF 2 x 4. (FOLLOW SAME PROCEDURE YOU DID ON THE COMMON RAFTERS-EXCEPT USE A 6 x 15 PITCH INSTEAD OF A 6 x 12 PITCH).
3. MEASURE 21-7/16" FROM THE LONG POINT OF THE PITCH. (SEE DRAWING BELOW)
4. MEASURE UP 2" FROM EDGE OF 2 x 4 AND MAKE A MARK.
5. HOLD YOUR SQUARE ON 6 x 15 TO FORM YOUR BIRD'S MOUTH (AS SHOWN BELOW).
CALL INSTRUCTOR IF HELP IS NEEDED.
6. CUT OUT HIP.

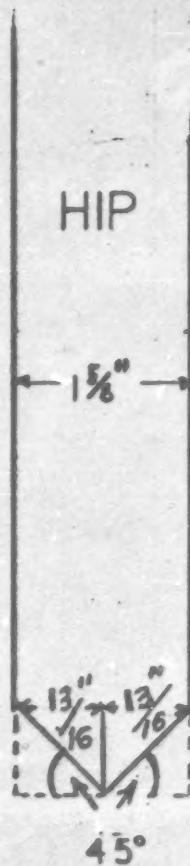


ROOF FRAMING

Pg. 44

LAYOUT AND CUTTING OF HIP

1. AT THE END AND ON THE TOP (NARROW EDGE) OF THE HIP, MEASURE $13/16"$ AND SQUARE A LINE AS SHOWN BELOW.
2. USE A COMBINATION SQUARE TO MAKE TWO 45° ANGLES (AS SHOWN BELOW).
CALL INSTRUCTOR IF HELP IS NEEDED.
3. CUT OFF THE 45° ANGLES.
4. REPEAT STEPS 1, 2, 3, AT THE OTHER END OF THE HIP (AS SHOWN BELOW).

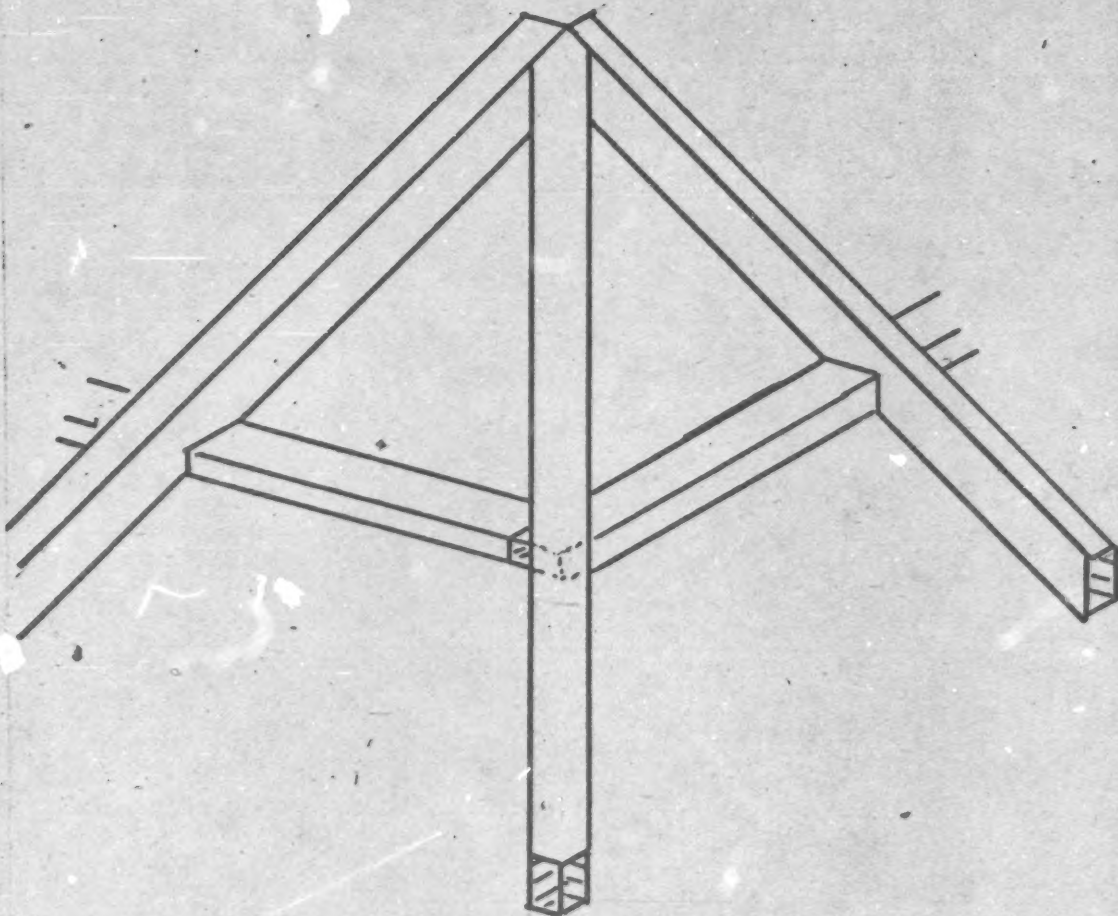


ROOF FRAMING

Pg. 45

INSTALLING HIP

1. SET HIP ON CORNER OF BUILDING AND TOENAIL TO PLATE WITH 8D COMMON NAILS (AS SHOWN BELOW).
2. NAIL RAFTERS ON EACH SIDE TO THE HIP WITH 8D COMMON NAILS.

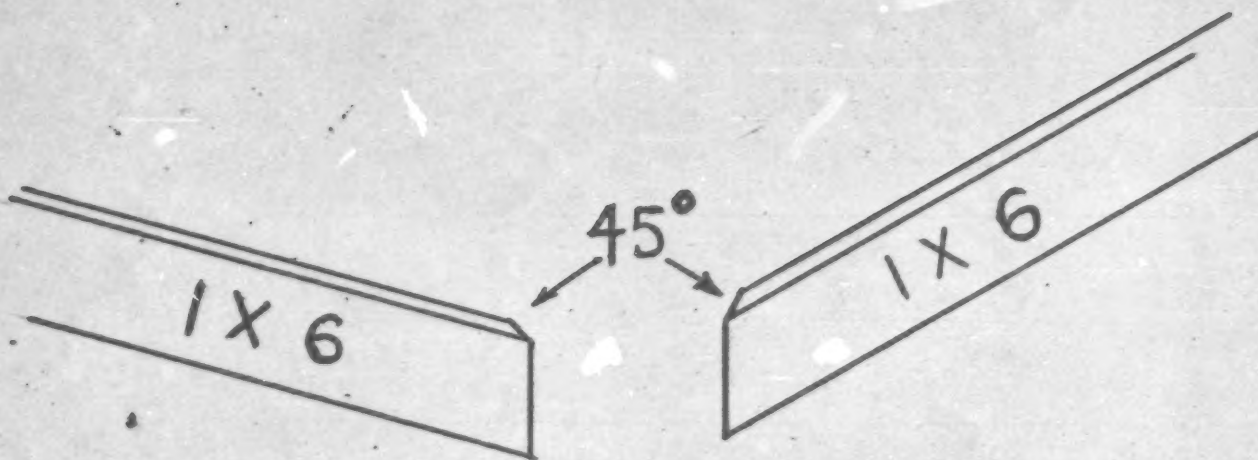


ROOF FRAMING

Pg 46

FASCIA

1. CUT TWO PIECES OF 1 x 6, 10'-0" LONG.
2. CONSTRUCT A 45° ANGLE ON ONE END OF EACH PIECE OF 1 x 6.
3. CUT OFF AT A 45° ANGLE (AS SHOWN BELOW).

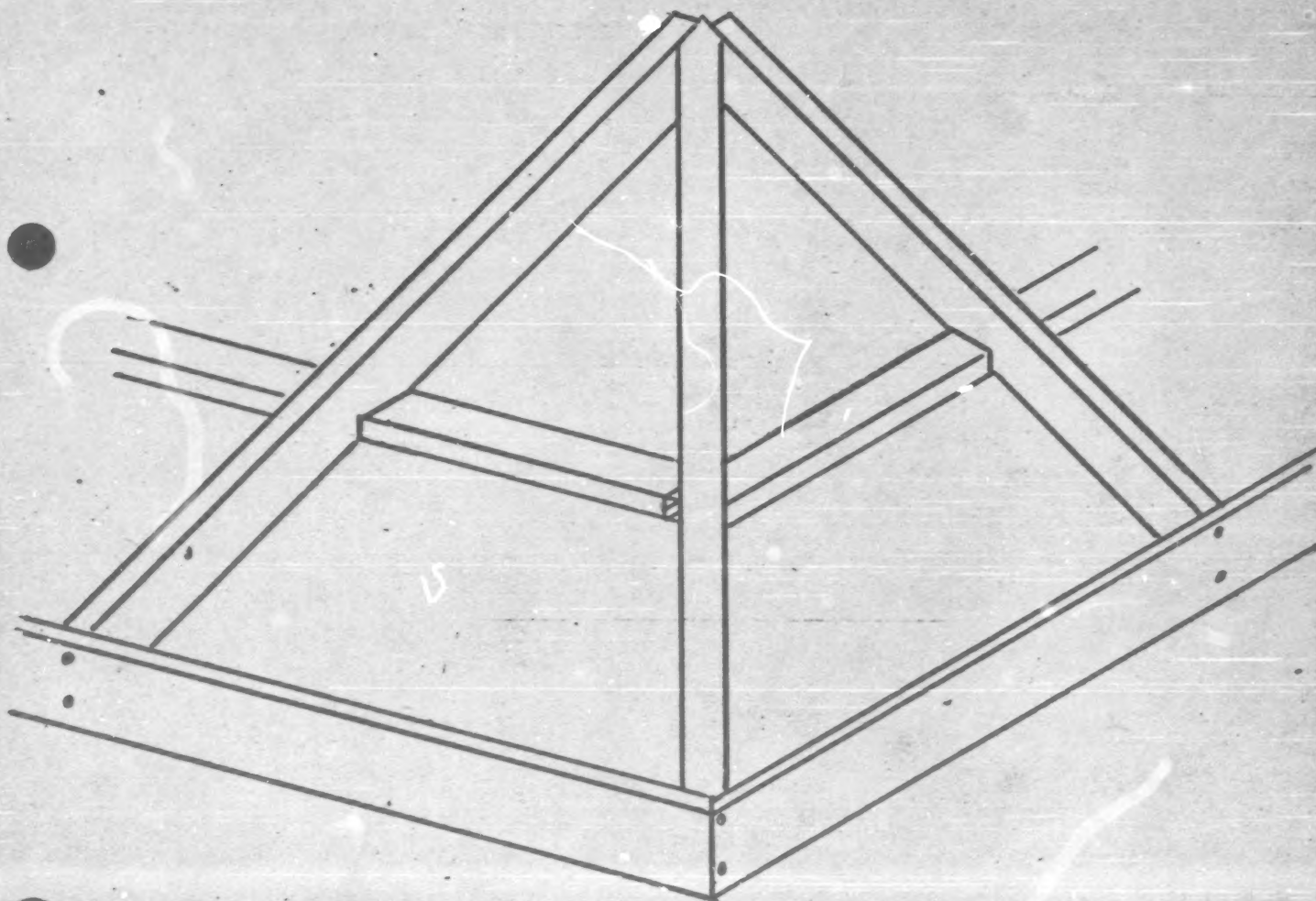


ROOF FRAMING

Pg. 47

INSTALLING FASCIA

1. FIT FASCIA ON RAFTER ENDS WITH 45° ANGLES MEETING AT THE HIP.
2. NAIL WITH TWO 6D FINISH NAILS ON EACH RAFTER END (AS SHOWN BELOW).
3. CUT OFF EXTRA AMOUNT FROM END OF FASCIA, EVEN WITH EDGE OF LAST RAFTER.



PLUMBING

PG. 1

TEACHER'S BLOCK/UNIT LESSON PLAN

PRE-TEST—NONE

PRE-REQUISITES—NONE

STUDENT OBJECTIVES:

THE STUDENT WILL BE ABLE TO:

1. PASS A PREPARED TEST COVERING PLUMBING TERMS, WITH A MINIMUM SCORE OF 70% CORRECT.
2. BE ABLE TO USE TRADE TERMS IN THE CLASSROOM IN AN ACCEPTABLE MANNER.
(INSTRUCTOR JUDGMENT)
3. IDENTIFY AT LEAST 80% OF PLUMBING TOOLS SHOWN HIM.
4. CUT AND THREAD VARIOUS SIZE PIPE.
5. CONSTRUCT, ON PAPER, A COLD OR HOT WATER SYSTEM AND LABEL ALL MAJOR PARTS.

REASON FOR OBJECTIVES:

SEE STUDENT PACKAGE.

LEARNING ACTIVITIES

1. SEE STUDENT PACKAGE
2. TERMS AND DEFINITIONS INSTRUCTOR WILL:
 - A. EXPLAIN PLUMBING TERMS
 - B. HAVE STUDENT FILL IN NAMES OF PARTS WHERE REQUIRED.
3. TOOL AND MATERIALS, INSTRUCTOR WILL:
 - A. INSTRUCT THE STUDENT IN THE USE OF TOOLS.
 - B. INSTRUCT THE STUDENT IN THE USE OF MATERIALS.
 - C. PROJECT

PLUMBING

PG. 2

INSTRUCTOR WILL:

1. INSTRUCT AND PREPARE THE STUDENT BEFORE PERMITTING HIM TO START ON HIS PROJECT.
2. ASSIST STUDENT WITH PROJECT WHEN NECESSARY.

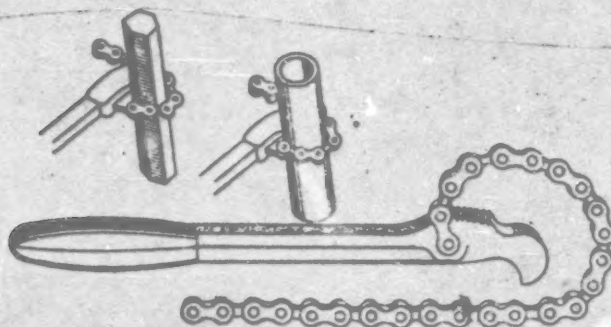
EVALUATION

THE STUDENT WILL BE EVALUATED BY THE INSTRUCTOR CONTINUALLY AS HE PROGRESSES THROUGH THE PACKAGE. THE STUDENT WILL BE GIVEN A WRITTEN TEST AT THE END OF PACKAGE.

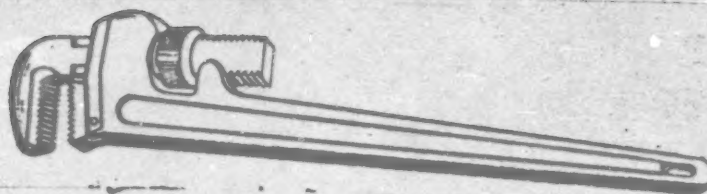
PLUMBING

Pg. 1

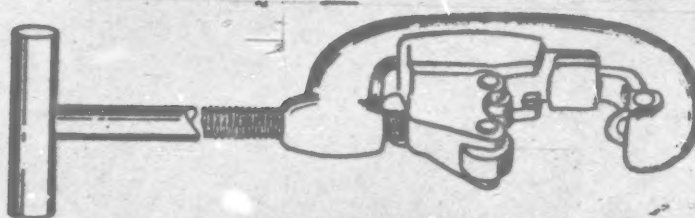
PLUMBING TOOLS



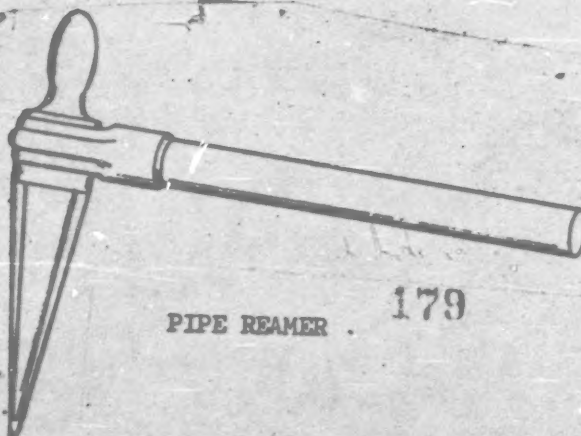
CHAIN WRENCH



PIPE WRENCH



PIPE CUTTER

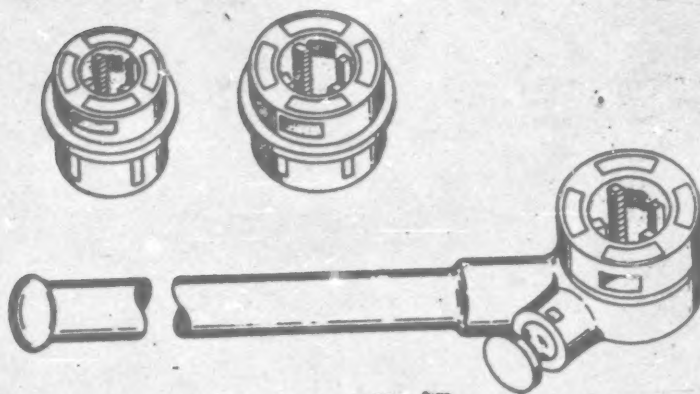


PIPE REAMER .

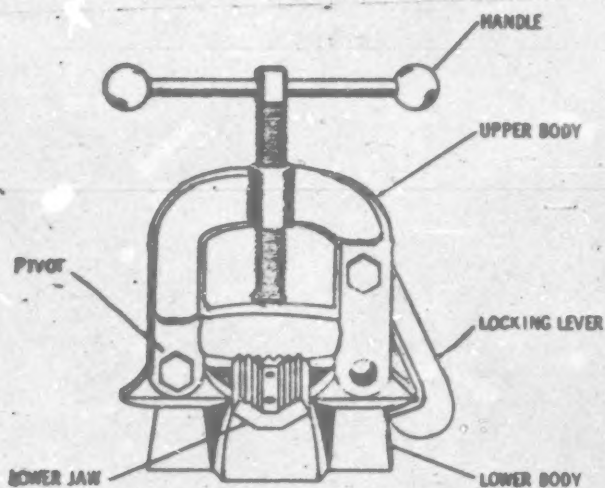
PLUMBING

Pg. 2

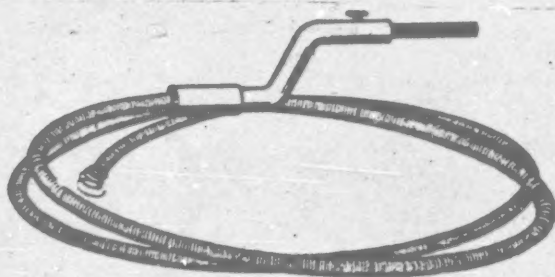
PLUMBING TOOLS



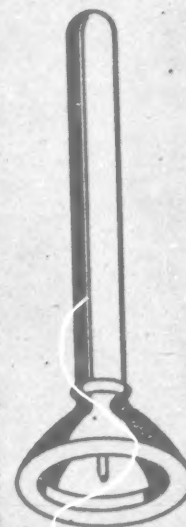
PIPE THREADER



WISE



SNAKE



PLUNGER

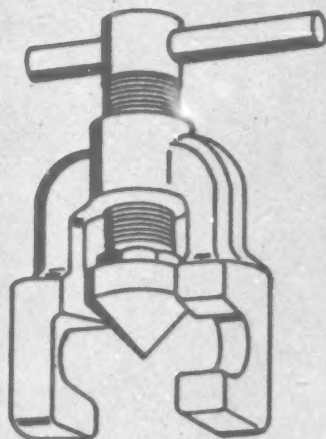


PLUNGER

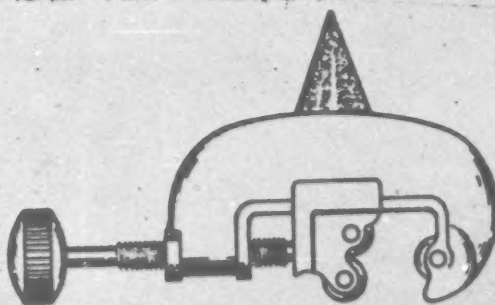
PLUMBING

Pg. 3

PLUMBING TOOLS



FLARING TOOLS



COPPER PIPE CUTTER



OUTSIDE PACKER



INSIDE PACKER



PICK-OUT IRONS

PLUMBING

PG. 1

STUDENT'S NAME _____
(FIRST) (LAST)

SECTION/CLASS _____ DATE BEGUN _____ TIME _____

TARGET COMPLETION DATE _____ DATE COMPLETED _____

PRE-TEST— NONE

STUDENT OBJECTIVES:

THE STUDENT WILL BE ABLE TO:

1. IDENTIFY AND USE PLUMBING TERMS IN THE CLASSROOM.
2. IDENTIFY PLUMBING TOOLS.
3. CUT AND THREAD PIPE.
4. DRAW AND CORRECTLY LABEL VARIOUS WATER SYSTEMS.

REASONS FOR OBJECTIVES

1. TO IMPROVE THE STUDENTS' UNDERSTANDING OF PLUMBING CONSTRUCTION AND PLUMBING MAINTENANCE.
2. TO ENABLE THE STUDENT TO MAKE MINOR PLUMBING REPAIRS.
3. TO STIMULATE THE STUDENT'S INTEREST IN THE PLUMBING TRADE.

LEARNING ACTIVITIES

THE STUDENT WILL:

1. BE GIVEN HANDOUTS LISTING PLUMBING TERMS AND DESCRIBING TOOLS AND MATERIALS. HE WILL STUDY THESE AND BECOME THOROUGHLY FAMILIAR WITH THEM.
2. PRACTICE CUTTING AND THREADING VARIOUS SIZED PIPE.
3. LAYOUT AND LABEL HOT WATER, COLDWATER SPRINKLING AND HEATING SYSTEMS.

PLUMBING

PG. 2

EVALUATION

THE STUDENT WILL BE EVALUATED BY THE INSTRUCTOR DURING THE ROUTINE OF CLASS WORK. THERE WILL BE A WRITTEN TEST ON TERMS, TOOLS, MATERIAL, AND PLUMBING MAINTENANCE.

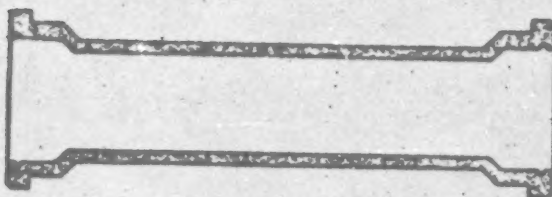
PLUMBING

Pg. 3

SOIL PIPE



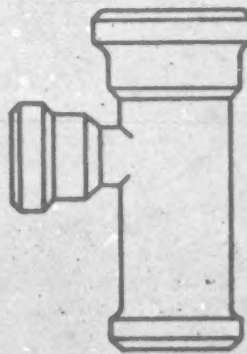
(A) Single hub



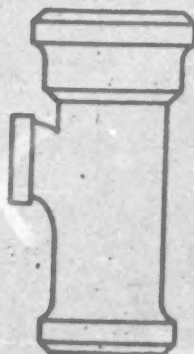
(B) Double-hub.



(A) Tapped T.



(B) Reducing T.



(A) Tapped T.

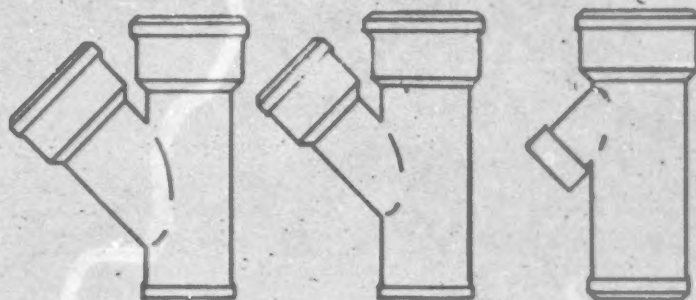


(B) Reducing T.

PLUMBING

Pg. 4

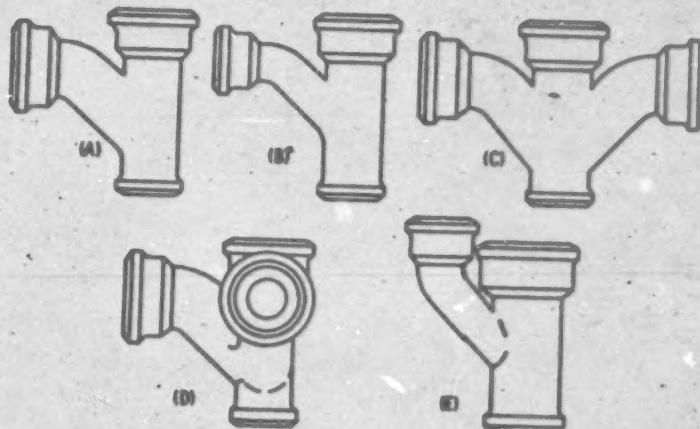
SOIL PIPE



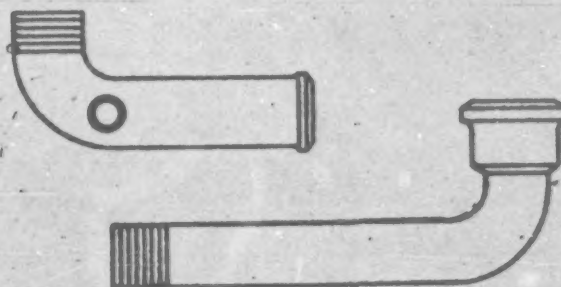
(A) Regular 45-degree.

(B) Reducing 45-degree.

(C) Topped inverted
45-degree.



90-degree branch soil-pipe fittings; (A) Regular; (B) Reducing;
(C) Double; (D) Box; (E) Upright.

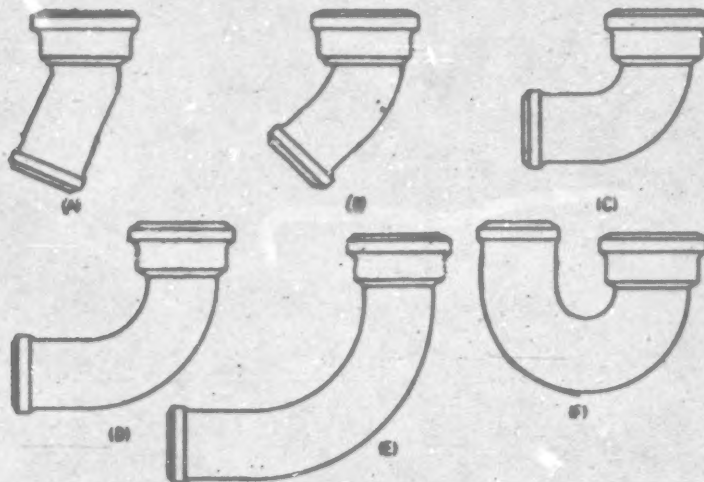


Soil-pipe elbow bands

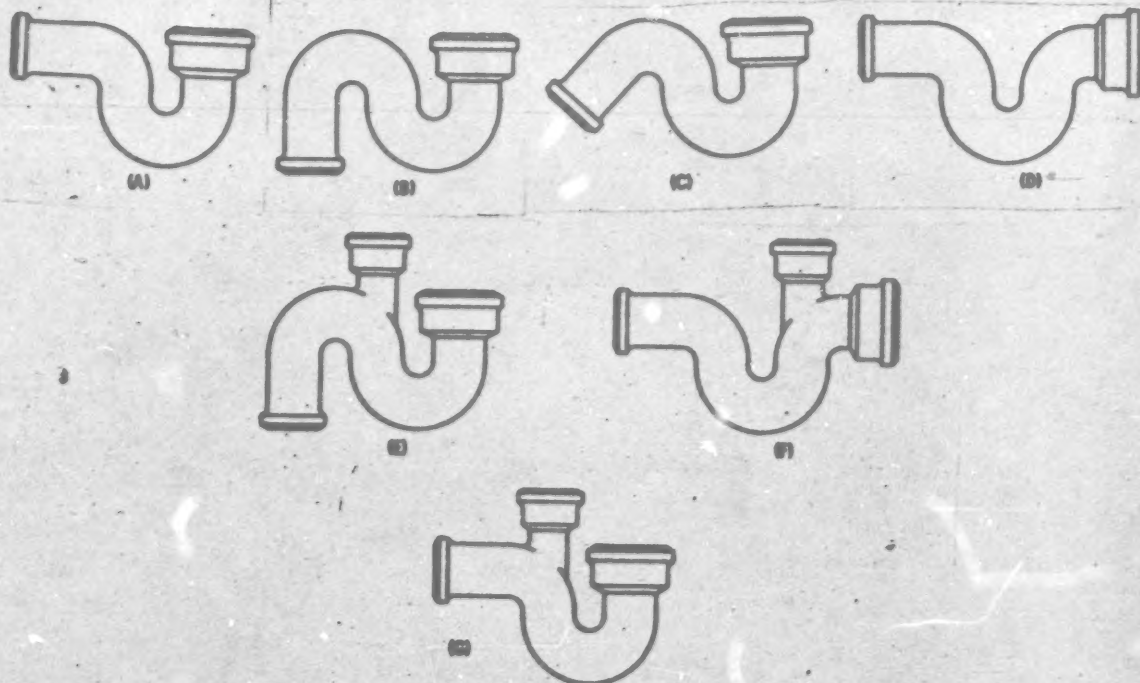
PLUMBING

Pg. 5

SOIL PIPE



Soil-pipe bends; (A) 1/16 regular; (B) 1/8 regular; (C) 1/4 regular; (D) 1/4 short sweep; (E) 1/4 long sweep; (F) 1/2 return.



Soil-pipe traps; (A) P-type; (B) S-type; (C) 3/4 S-type; (D) Running-type; (E) Vented S-type; (F) Vented running-type; (G) Vented P-type.

PIPE FITTINGS



90° ELBOW
REDUCING



90° STREET ELBOW
REDUCING ON MALE END



TEE
WITH OUTLET REDUCED



RIGHT HAND
SIDE OUTLET 90° ELBOW
REDUCING ON TWO OUTLETS



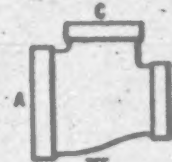
LEFT HAND



TEE
WITH ONE END
OF RUN REDUCED



SERVICE TEE
REDUCING ON MALE END ONLY



TEE
WITH ONE END OF RUN
AND OUTLET REDUCED



RIGHT HAND



LEFT HAND

SIDE OUTLET TEES
WITH ONE END OF RUN AND OUTLETS REDUCED

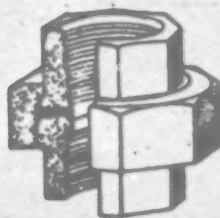
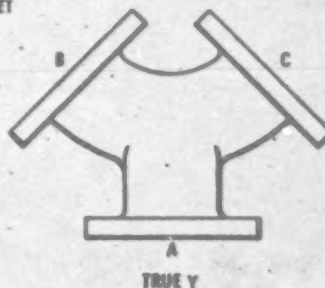
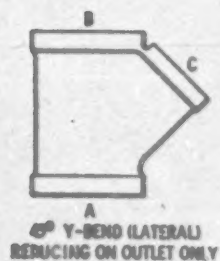
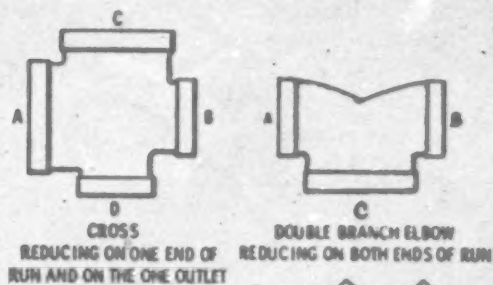
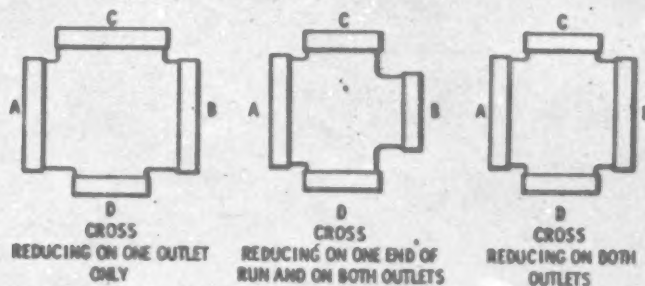


TEE
BULL-HEAD TYPE - BOTH
ENDS OF RUN REDUCED

PLUMBING

Pg. 7

PIPE FITTINGS



UNION

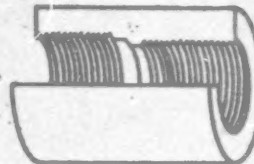
PLUMBING

Pg. 8

CAST FITTINGS

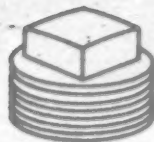


(A) Standard.

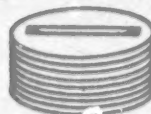


(B) Reducing.

Fig. 31. Couplings.



(A) Square-head plug.

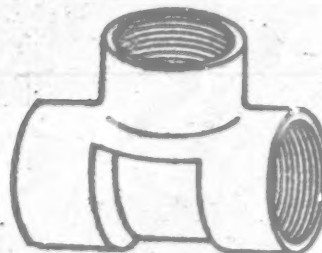


(B) Slotted-head plug.

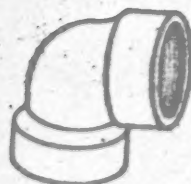


(C) Cap.

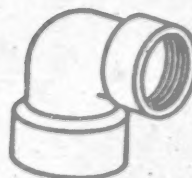
PIPE PLUGS AND CAPS



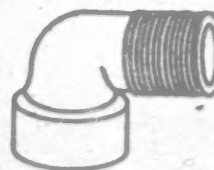
A CAST-IRON THREADED T.



(A) 90-degree elbow.



(B) Reducing elbow.



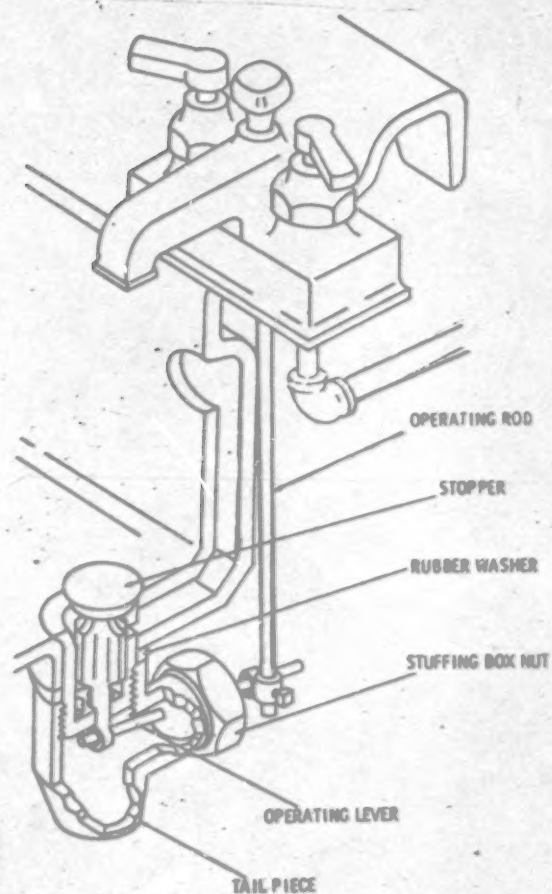
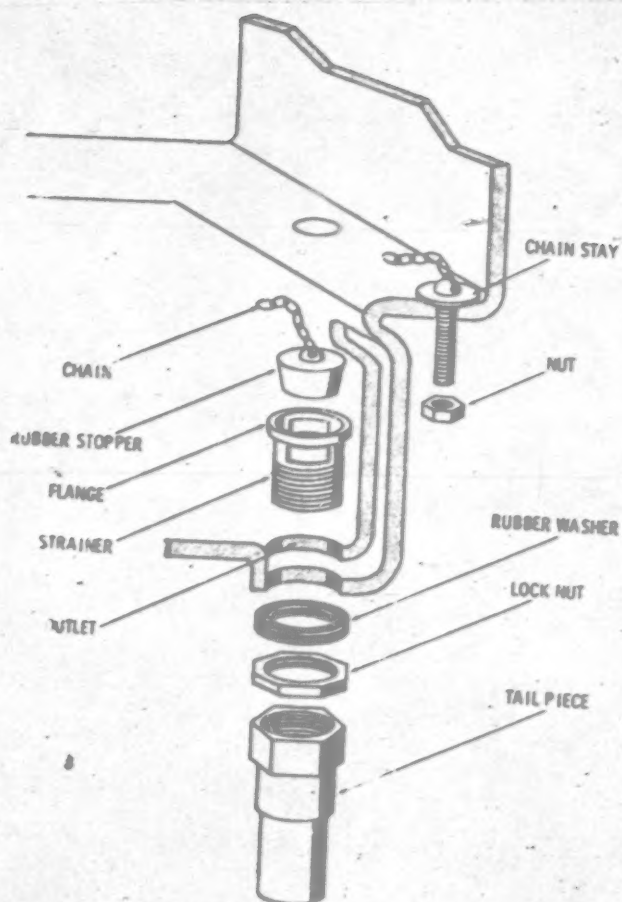
(C) Street elbow.

CAST-IRON THREADED ELBOWS

PLUMBING

Pg. 9

SINKS



LAVATORY

MATERIAL LIST

MATERIAL	SIZE	TYPE	QUANTITY
CLIPS		PIPE	3
PIPE	1/2"	GALVANIZED	6'-0"
ELBOWS	1/2"	90°	3
FAUCETS	1/2"		1
PERMATEX		TUBE	1
HOSE BIB			1
NAILS	8D	COMMON	

TOOL LIST

MATERIAL	SIZE	TYPE	QUANTITY
HAMMER		16 oz.	1
SAW		CROSSCUT	1
WRENCH		PIPE	1
SQUARE		FRAMING	1
LEVEL	28"		1
	191		

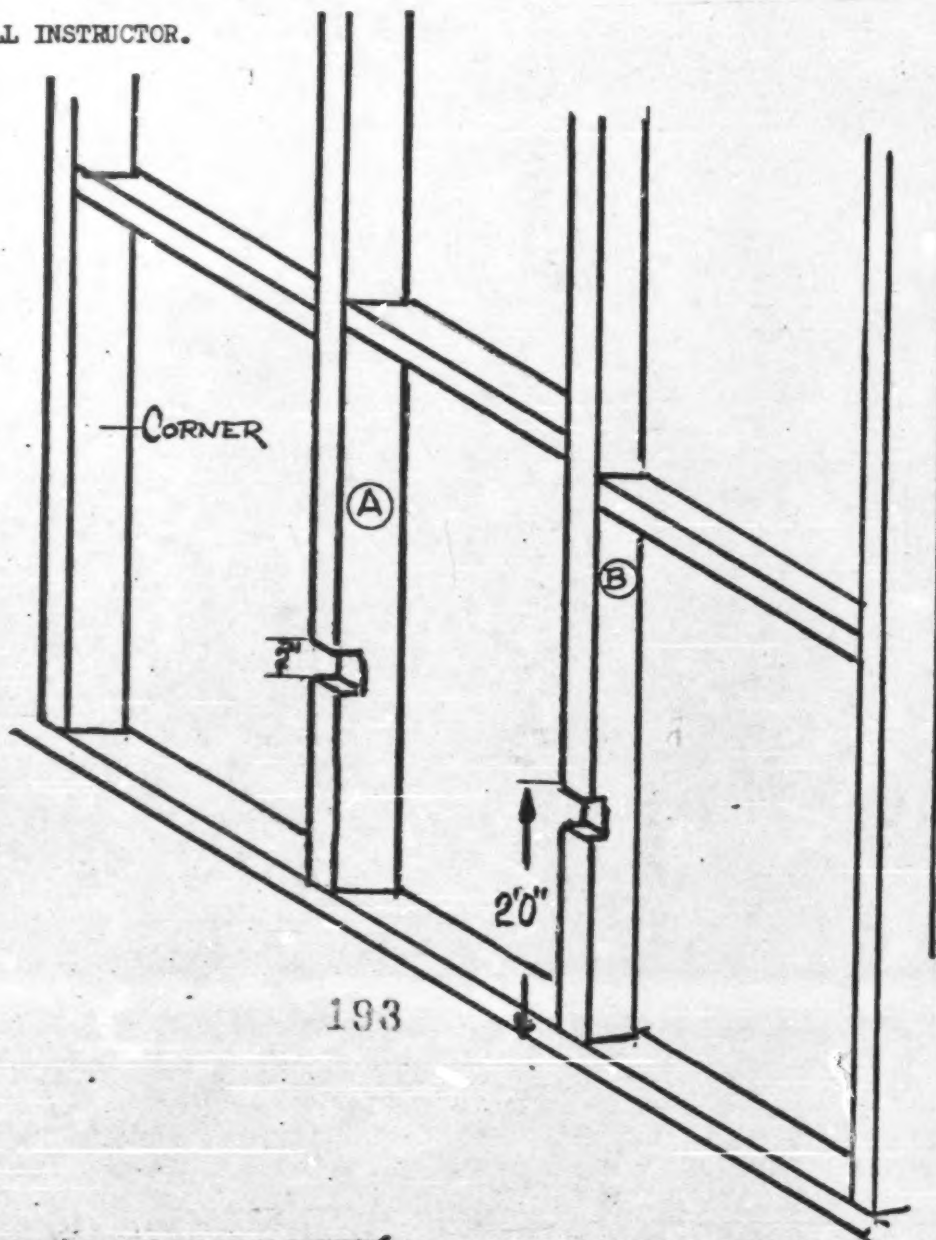
ELBOW: A DEVICE USED FOR MAKING A 90° TURN IN A PLUMBING PIPE



90° ELBOW

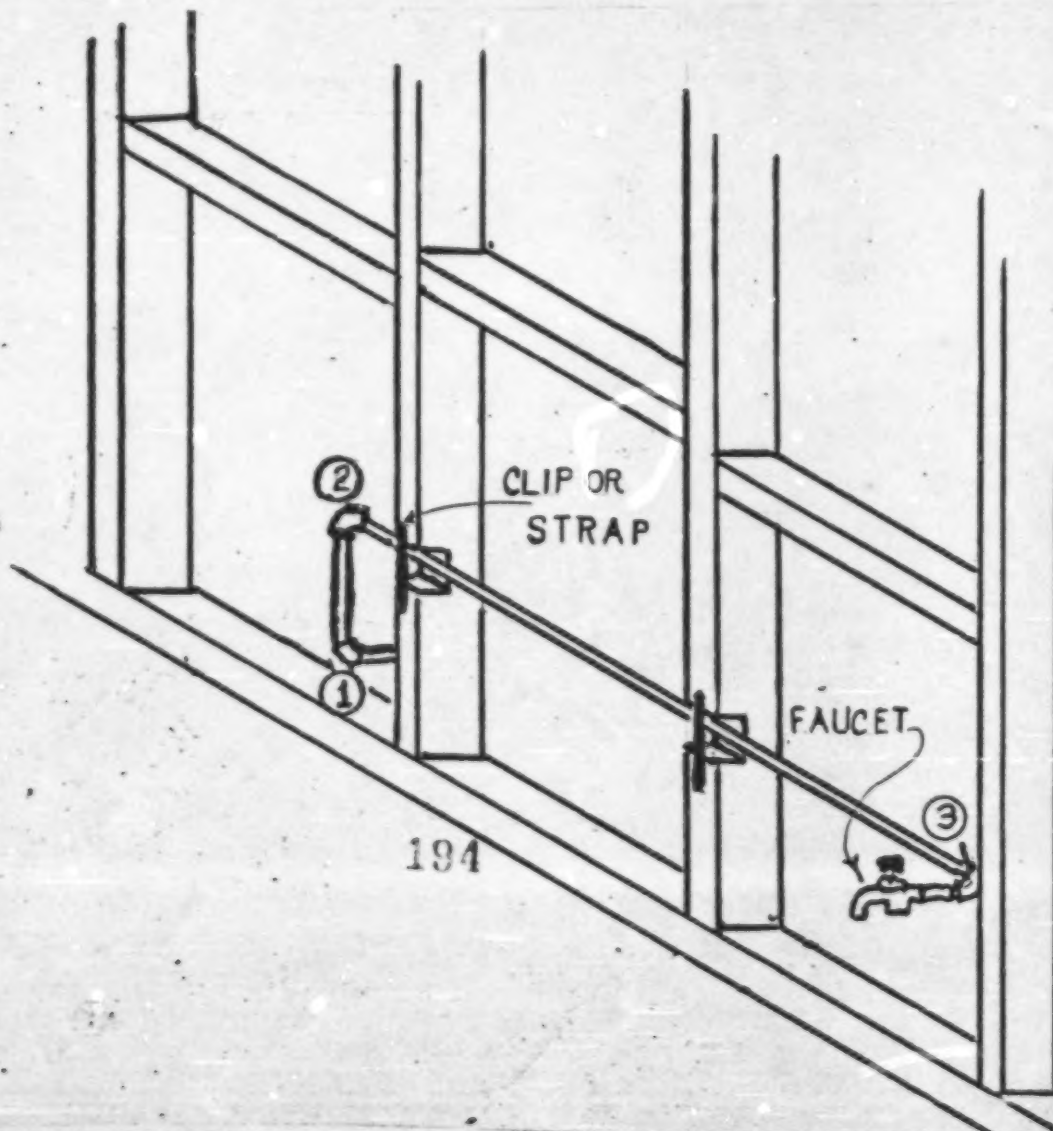
NOTCHING FOR PIPE

1. IN THE WALL WITHOUT THE DOOR, LOCATE THE TWO STUDS NEXT TO THE CORNER (A AND B) (SEE DRAWING BELOW).
2. 2'-0" FROM FLOOR DRAW A LINE ACROSS THESE TWO STUDS (A AND B), ON NARROW EDGE (SEE BELOW).
3. MEASURE UP 2" FROM THIS LINE AND STRIKE ANOTHER LINE.
4. TAKE SAW AND NOTCH STUDS (A AND B), ON THE LINES OF A DEPTH OF 1½".
5. CALL INSTRUCTOR.



RUNNING PIPE

1. CONNECT THE SHORTEST PIECE OF 1/2" GALVANIZED PIPE TO ELBOW #1 (CALL INSTRUCTOR).
2. CONNECT A PIECE OF 1/2" GALVANIZED PIPE 22-3/8" LONG IN OTHER END OF ELBOW #1 (CALL INSTRUCTOR).
3. CONNECT THIS TO ELBOW #2.
4. CONNECT 4'-2" PIPE TO OTHER END OF ELBOW #2 (CALL INSTRUCTOR).
5. CONNECT ELBOW #3 TO END OF THE 4'-2" PIPE (SEE DRAWING).
6. LEVEL PIPE IN NOTCHES.
7. CONNECT FAUCET (CALL INSTRUCTOR).
8. INSTALL STRAPS OR CLIPS (CALL INSTRUCTOR).



BLOCK-UNIT PLAN FOR TEACHER

PRE-TEST: NONE

PRE-REQUISITE: NONE

STUDENT OBJECTIVES:

THE STUDENT WILL BE ABLE TO:

1. PASS A WRITTEN TEST COVERING ELECTRICAL SAFETY AND COLOR CODE WITH A MINIMUM SCORE OF 80% CORRECT.
2. PASS A WRITTEN TEST COVERING TOOLS AND MATERIALS WITH A MINIMUM SCORE OF 70% CORRECT.
3. WIRE SWITCHES TO MEET APPROVED INDUSTRIAL STANDARDS AND CODES.
4. WIRE OUTLETS TO MEET APPROVED INDUSTRIAL STANDARDS AND CODES.
5. SPLICE WIRES TO MEET APPROVED INDUSTRIAL STANDARDS AND CODES.
6. EXPLAIN ELECTRICAL SYSTEMS ORALLY.

LEARNING ACTIVITIES:

IN THE FOLLOWING PACKAGE THE STUDENT WILL STUDY AND BECOME FAMILIAR WITH TOOLS, MATERIALS, ELECTRICAL SAFETY AND TERMS.

HE WILL CORRECTLY WIRE SWITCHES, OUTLETS AND LIGHTING FIXTURES.

EVALUATION:

THE STUDENT WILL BE CONTINUALLY EVALUATED THROUGHOUT THE COURSE BY THE INSTRUCTOR FOR MANIPULATIVE SKILLS.

A WRITTEN TEST MAY ALSO BE GIVEN AT THE END OF THE PACKAGE.

BLOCK-UNIT PLAN FOR TEACHER (CONT'D)

A. TERMS AND DEFINITIONS:

INSTRUCTOR WILL:

1. EXPLAIN THE TERMS USED IN THE HANDOUTS.
2. HAVE STUDENTS FILL IN ALL INFORMATION NEEDED IN HANDOUTS.

B. SAFETY:

INSTRUCTOR WILL:

1. INSTRUCT STUDENT IN THE USE OF PROPER COLOR CODE, 3 WIRE CORDS AND ROMEX.
2. INSTRUCT STUDENT IN THE PROPER USE OF COLOR CODE OF 2 WIRE SYSTEMS.

C. MATERIALS:

INSTRUCTOR WILL INSTRUCT BY THE USE OF HANDOUTS, DRAWINGS, FILMS AND ACTUAL MATERIALS:

1. ROMEX
 - a. SAFETY
 - b. SPLICING
2. CONDUIT
 - a. CUTTING
 - b. SIZES
 - c. BENDING
3. INSTALLATION OF ELECTRICAL SYSTEMS
 - a. BLOCK WALLS
 - b. STUD WALLS
 - c. UNDERGROUND
4. PULLING OF WIRE
5. SWITCHES
6. PLUGS
7. CORDS

BLOCK-UNIT PLAN FOR TEACHER (CONT'D)

D. IMPLEMENTATION OF PROJECT:

INSTRUCTOR WILL:

1. ASSIST STUDENT IN PROJECT WORK.
2. CHECK ALL ELECTRICAL SYSTEMS WHEN COMPLETE.

CAREERS IN CONSTRUCTION,
BUILDING MAINTENANCE AND
ALLIED OCCUPATIONS
BLOCK IV UNITS A, B, C AND D

Vocational Exemplary Program
Dade County Public Schools

ELECTRICAL

Pg. 4

STUDENT'S NAME _____
(LAST) (FIRST)

CLASS/SECTION _____ STARTED: TIME: _____ DATE: _____

TARGET COMPLETION TIME: _____

COMPLETED: TIME: _____

PRE-TEST: NONE

STUDENT OBJECTIVES:

THE STUDENT WILL BE ABLE TO:

1. IDENTIFY AND USE PROPER TOOLS AND TERMS.
2. IDENTIFY COLOR CODES.
3. DO ALL WORK IN ACCORD WITH GOOD SAFETY METHODS.
4. WIRE SWITCHES TO MEET APPROVED INDUSTRIAL STANDARDS AND CODES.
5. WIRE OUTLETS TO MEET APPROVED INDUSTRIAL STANDARDS AND CODES.
6. SPLICE WIRES TO MEET APPROVED INDUSTRIAL STANDARDS AND CODES.

REASONS FOR OBJECTIVES:

TO IMPROVE THE STUDENT'S KNOWLEDGE AND SKILLS IN THE ELECTRICAL TRADE.

TO QUALIFY HIM TO DO MINOR ELECTRICAL MAINTENANCE.

LEARNING ACTIVITIES:

1. PRACTICE IN WIRING SWITCHES AND OUTLETS.
2. PRACTICE IN SPLICING WIRE.
3. SURVEY AND BECOME FAMILIAR WITH COLOR CODES, TOOLS AND TERMS.

EVALUATION:

THE STUDENT WILL BE EVALUATED ON MANIPULATIVE SKILLS THROUGHOUT THE COURSE BY THE INSTRUCTOR. HE MAY ALSO BE GIVEN A WRITTEN TEST AT THE END OF THE COURSE, COVERING SAFETY, TERMS, MATERIALS, TOOLS AND SYSTEMS.

MATERIAL LIST

MATERIAL	SIZE	TYPE	QUANTITY
WIRE	14-2	ROMEX	15'-0"
BOX		OUTLET	1
BOX		SWITCH	1
BOX		LIGHT	1
NAILS	6 D	COMMON	

TOOL LIST

MATERIAL	SIZE	TYPE	QUANTITY
HAMMER		16 oz.	1
CHALK BOX			1
BRACE			1
BIT	3/4	AUGER	1
CUTTERS		WIRE	1
STRIPPERS		WIRE	1
SCREWDRIVER		FLAT	1
RULE	6 FT.	FOLDING	1
PENCIL	199		1

ELECTRICAL

Pg. 1

ELECTRICAL SAFETY TEST

1. THE COLOR OF THE GROUND WIRE IN A 3 WIRE SYSTEM IS ? _____
2. THE COLOR OF THE SCREW ON A SWITCH THAT YOU CONNECT THE GROUND WIRE TO
IS? _____
3. HOW MANY VOLTS IS THE STANDARD HOUSE OUTLET ? _____
4. WHAT COLOR IS THE HOT OR POSITIVE WIRE IN A 2 WIRE SYSTEM ? _____
5. HOW MANY VOLTS DOES A STANDARD ELECTRIC STOVE TAKE ? _____
6. WHAT COLOR IS THE HOT OR POSITIVE WIRE IN A 3 WIRE SYSTEM ? _____
7. A FUSE BOX IS USUALLY FOUND CLOSE TO THE _____
8. WHAT IS THE COLOR OF THE NEGATIVE WIRE IN A 2 WIRE SYSTEM ? _____
9. WHAT IS THE COLOR OF THE SCREW ON A WALL OUTLET FOR THE HOT OR POSITIVE
WIRE ? _____
10. CONNECTING THE GROUND WIRE FROM A 3 WIRE CORD TO THE FACE SCREW OF A
2 WIRE WALL OUTLET IS CALLED ? _____

ELECTRIC

Pg. 2

SWITCHES & OUTLETS

A. DUPLEX OUTLET RECEPTACLE



A

B. PORCELAIN LAMPHOLDER, KEYLESS



B

C. PORCELAIN LAMPHOLDER, PULL-CHAIN



C

D. ELECTRIC RANGE OUTLET-220V



D

E. TELEPHONE OUTLET



E

ELECTRIC

Pg. 3

SWITCHES & OUTLETS

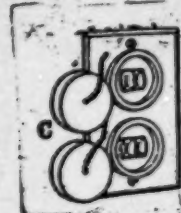
A. GROUNDED-TYPE OUTLET-3 WIRE

B. GROUNDED TYPE OUTLET-230 VOLTS

C. WATER PROOF OUTLET

D. CHOCK HANGER OUTLET

E. FAN HANGER OUTLET



ELECTRIC

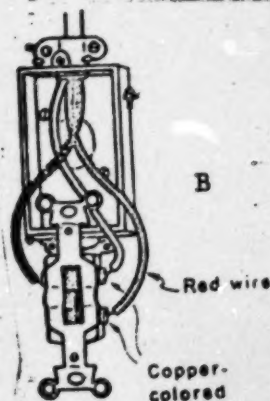
Page 4

SWITCHES

- A. DOUBLE-POLE SWITCH
(CONTROLS TWO LIGHTS LIKE BASEMENT
AND HEAD-OF-THE-STAIRS LIGHT.)



- B. THREE-WAY SWITCH
(CONTROLS ONE LIGHT FROM TWO LOCATIONS)

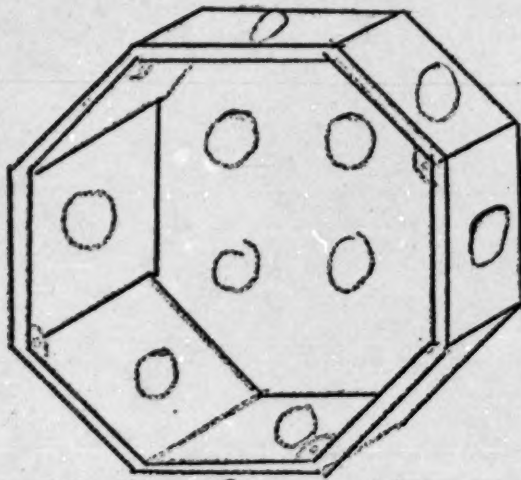


- C. SWITCH & OUTLET COMBINATION

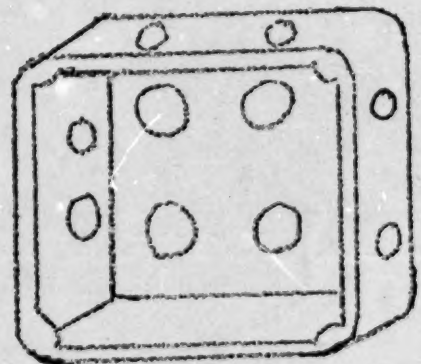


- D. DOUBLE SWITCH & NIGHT LIGHT

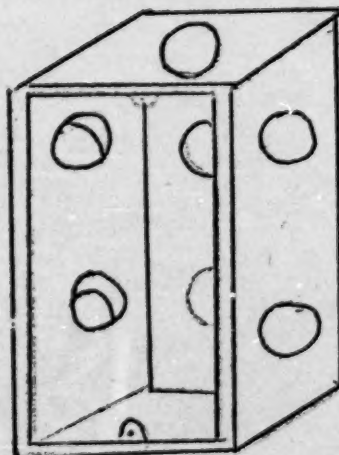




LIGHT BOX



WALL BOX



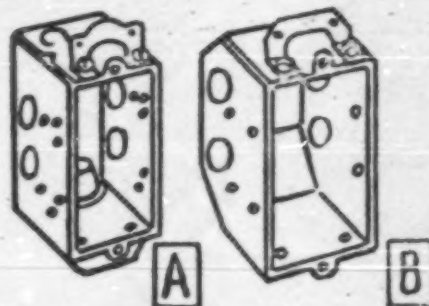
SWITCH BOX

ELECTRIC

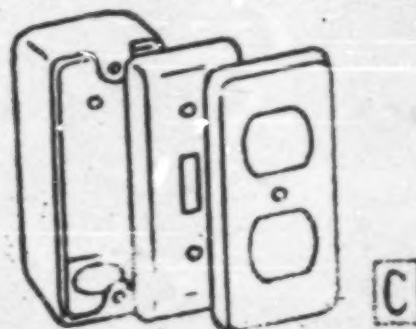
Pg. 6

ELECTRICAL BOXES

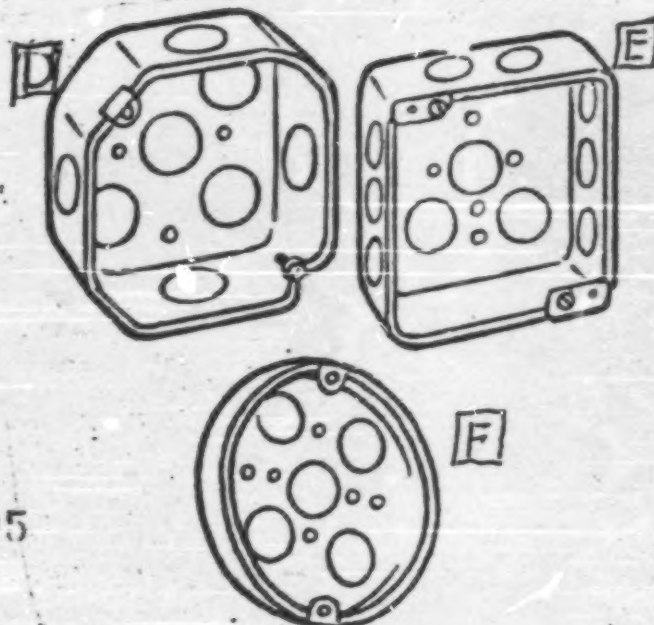
- A. SWITCH BOX
- B. BEVELED CORNER BOX



- C. SURFACE UTILITY BOX



- D. OCTAGON OUTLET BOX
- E. SQUARE OUTLET BOX
- F. ROUND OUTLET BOX

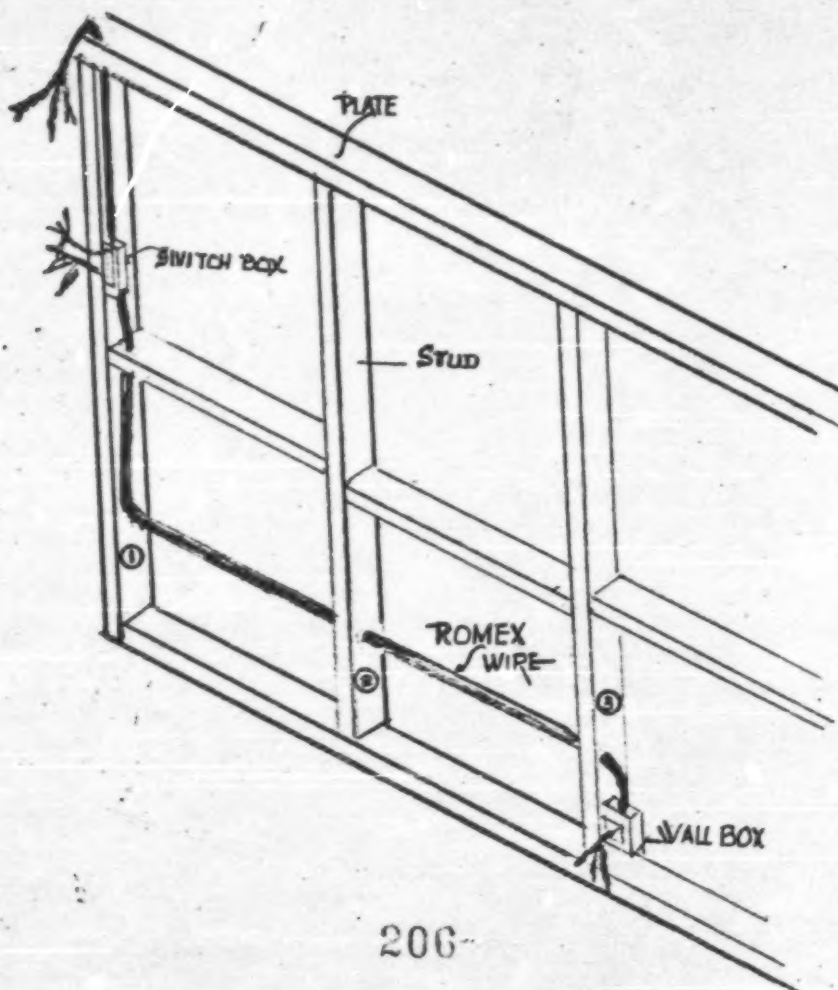


ELECTRICAL

Pg. 7A

PULLING ROMEX

1. PUSH ONE END OF 14-2 ROMEX WIRE, THROUGH TOP OF WALL BOX.
2. FEED THE ROMEX THROUGH HOLES IN STUDS AND FEED THROUGH HOLE IN BOTTOM OF WALL SWITCH BOX (SEE DRAWING BELOW).
3. LET WIRE HANG OUT OF BOX ABOUT 8" AND CUT OFF.
4. FEED SECOND PIECE OF WIRE THROUGH TOP OF WALL SWITCH BOX AND EXTEND UP #1 STUD THROUGH $\frac{3}{4}$ " HOLE IN PLATE (SEE DRAWING BELOW).

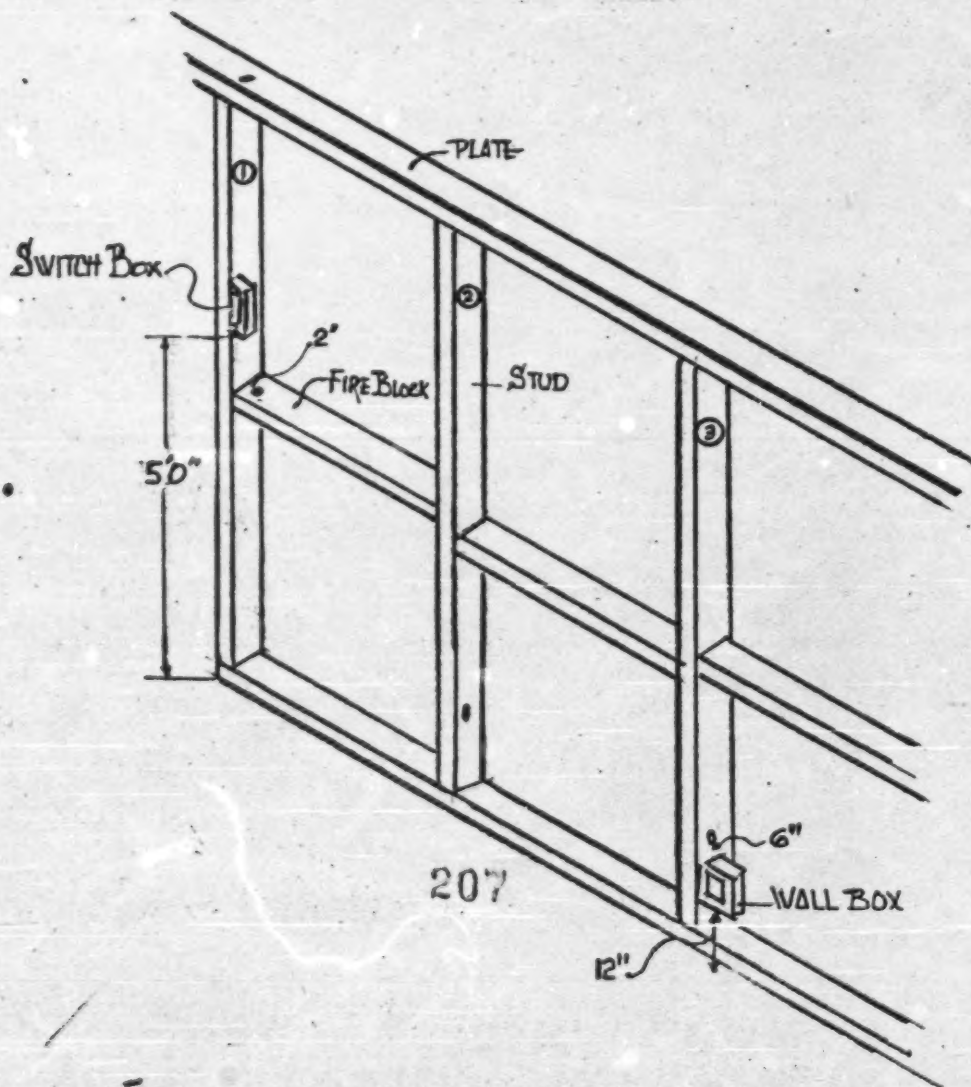


ELECTRICAL

Fig. 7

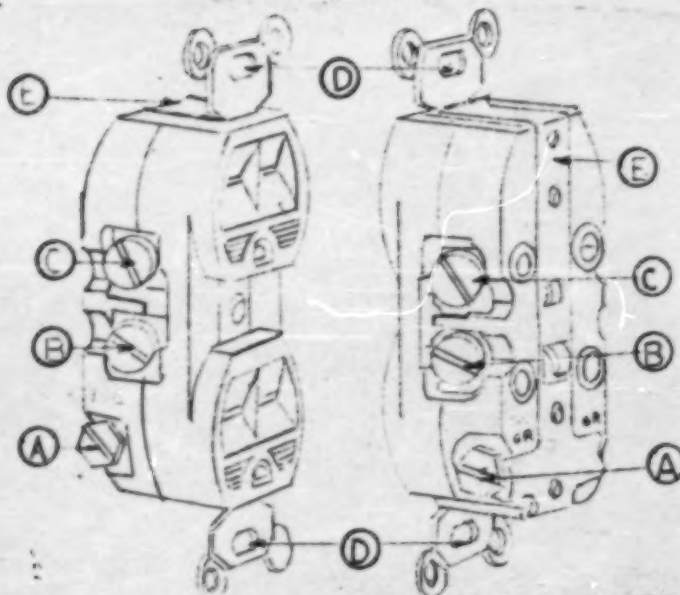
SETTING BOXES

1. START ON THE INSIDE WALL WITH THE DOOR AND LOCATE THE THIRD STUD. (#3 IN DRAWING BELOW).
2. MEASURE 12" FROM THE FLOOR AND MARK THE #3 STUD.
3. ALIGN THE BOTTOM OF THE WALL BOX ON THIS LINE; WITH THE FRONT OF THE WALL BOX FLUSH WITH #3 STUD (SEE DRAWING BELOW).
4. NAIL WALL BOX TO THE SIDE OF THE #3 STUD.
5. DRILL A $\frac{3}{4}$ " HOLE 6" ABOVE WALL BOX IN #3 STUD (SEE DRAWING BELOW).
6. DRILL A $\frac{3}{4}$ " HOLE IN THE #2 STUD AT SAME HEIGHT AS THE ONE IN #3 STUD.
7. DRILL A $\frac{3}{4}$ " HOLE IN FIRE BLOCK 2" FROM #1 STUD JUST BELOW THE SWITCH BOX.
8. DRILL A $\frac{3}{4}$ " HOLE IN PLATE DIRECTLY ABOVE THE SWITCH BOX.



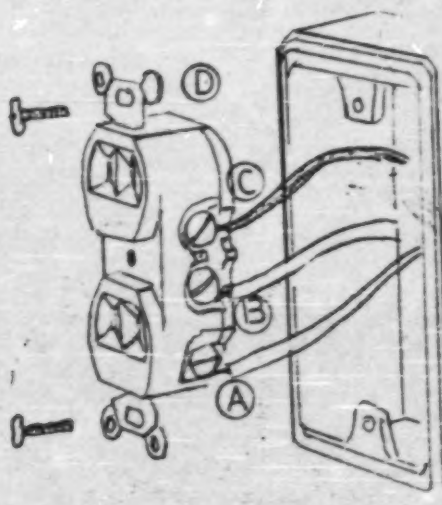
INSTALLING RECEPTACLES

- A. GROUND SCREW - GREEN IN COLOR TO MATCH COLOR CODE FOR GROUND WIRE.
- B. NEGATIVE SCREW - SILVER (WHITE COLOR) SCREW FOR WHITE WIRE.
- C. POSITIVE SCREW - BRASS COLORED SCREW FOR ANY COLOR WIRE OTHER THAN GREEN OR WHITE.
- D. SCREW PLATE HOLES - HOLES IN MOUNT PLATE TO HOLD SCREW FOR ATTACHING TO RECEPTACLE BOX.
- E. GROUND STRAP - RUNS FROM GROUND SCREW TO MOUNTING PLATE, (THE SCREW IN PLATE GROUNDS RECEPTACLE TO RECEPTACLE BOX.)



INSTALLING RECEPTACLE

1. CONNECT GROUND WIRE TO GROUND SCREW (A) AND TIGHTEN.
2. CONNECT NEGATIVE WIRE TO NEGATIVE SCREW (B) AND TIGHTEN.
3. CONNECT POSITIVE WIRE TO POSITIVE SCREW (C) AND TIGHTEN.
4. CAREFULLY FOLD WIRES TO PUSH RECEPTACLE INTO BOX.
5. LINE UP PLATE HOLES WITH BOX HOLES AND INSERT SCREWS (D).
6. TIGHTEN SCREWS.
7. YOU ARE NOW READY FOR FACE PLATE.



INSTALLING FACE PLATE

1. MAKE SURE RECEPTACLE IS TIGHTLY SCREWED TO BOX.
2. PLACE FACE PLATE OVER RECEPTACLE WITH THE HOLE IN THE CENTER OF THE PLATE MATCHING THE HOLE IN THE CENTER OF THE RECEPTACLE. (A)
3. PLACE SCREW IN CENTER HOLE AND TIGHTEN.

